THE LARGEST MODEL HOBBY MAGAZINE IN THE WORLD

U.S. ONE DOLLAR TWENTY FIVE CENTS/U.K. 60p

AMERICAN aircraft modeler

INCLUDING THE OFFICIAL NEWS OF THE ACADEMY OF MODEL AERONAUTICS

AUGUST 1974

THERMOPYLAE Famous Clipper
She was the majestic clipper ship that dared to challenge the unrivaled speed of the Cutty Sark, New York to London, circa 1868. Designed by Bernard Waymuth and launched, Aberdeen, Scotland, she was 212 ft. LOA, 36 ft. beam.
Kit 182, **$54.95 • Length 31", Height 19½"**

New Additions to our Fleet!

MAN O'WAR, French 17th Century 96 Gun Ship
The Soleil Royal was the symbol of French sea power throughout the 17th Century and considered superior to English counterparts. Her better lines, maneuverability and armament advantage made ships like her a threat to England's mastery of the sea, until 1672.
Kit 185, **$24.95 • Length 17", Height 13"**

SCIENTIFIC

Collectors Series

$12.95 and $14.95

Authentic, museum quality replicas of Famous ships of history now at modest prices . . . all with carved wood hulls and precision cast-metal fittings.

All ships shown with sails include antique finish cloth sails, colorful flags and decals, tapered hardwood masts and yards, rigging materials, pre-ruled decking, wood display stand, handsome nameplate, and complete, easy to follow step-by-step assembly instructions.

A. Kit 174, **Cutty Sark,** length 15", Clipper Ship, **$12.95**

B. Kit 168, **U.S.S. Eagle,** length 13", Coast Guard Training Ship, **$12.95**

C. Kit 178, **Schooner America,** length 17", Circa 1868, **$14.95**

D. Kit 169, **H.M.S. Bounty,** length 14", of the famous mutiny, **$12.95**

E. Kit 167, **Flying Cloud,** length 14", Clipper Ship, **$12.95**

F. Kit 170, **U.S.S. Constitution,** length 14", "Old Ironsides," **$12.95**

See your Dealer. If kits are not available at dealer, you may order direct from the factory, adding $1.00 for postage and handling. Outside U.S.A. add $2.00.

SEND FOR CATALOG 25¢

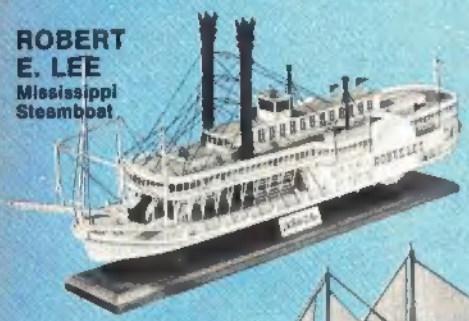
SCIENTIFIC MODELS INC.
340GH Snyder Avenue, Berkeley Heights, N. J. 07922

SCIENTIFIC

Wood Ship Models

The kits that make Authentic Ship Modeling easy!

ROBERT E. LEE
Mississippi Steamboat

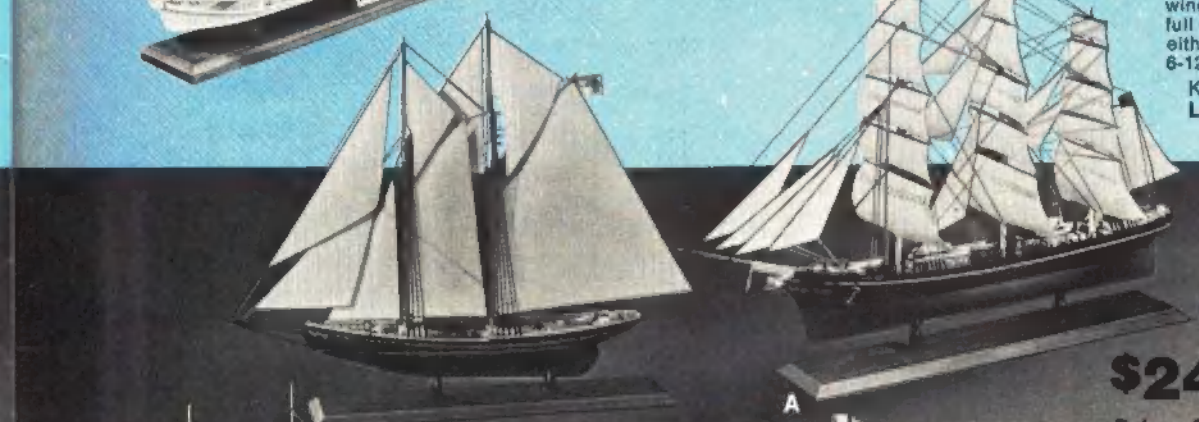


This famous sidewheeler kit includes pre-shaped smoke stacks, carved hull, cast-metal fittings, formed deck-railings, handsome nameplate and display stand, and easy to follow instructions.

Kit 181, **$36.95**
Length 24½"

SPORT FISHERMAN
Seamaster Deluxe Kit for free running or radio control
This world famous sport fisherman is complete with fittings and extras that you won't find in any other kit, including efficient nylon prop, welded 1-piece rudder and tiller, die-cut, and numbered bulkheads and keel, decals, plastic windshield, easy to follow, full size plans, powered by either .049 gas or electric 6-12 V motor.

Kit 179, **$36.95**
Length 27", Beam 8½"



A

B

D

C

E

F

G

7 Great Classics
$24.95 to $29.95

Deluxe Ship Model Kits with over 100 hand crafted parts, carved wood hull and cast metal fittings.

Here are 7 of our most popular ship models that include colorful flags and decals, tapered hardwood masts and yards, rigging materials, pre-ruled decking, wood display stand, handsome nameplate, and complete, easy to follow, step-by-step assembly instructions. The highest quality materials are used throughout, with precision scale detailing and all the extras to make modeling the most rewarding. Models shown with sails include antique-finish cloth sails.

A. Kit 163, **Cutty Sark,** length 24", famous Clipper Ship, **$24.95**

B. Kit 164, **Bluenose** length 24", famous "Down East" Schooner, **$24.95**

C. Kit 177, **Golden Hind,** length 20", English Flagship, **$24.95**

D. Kit 166, **U.S.S. Kearsarge,** length 27", Civil War Gunboat, **$29.95**

E. Kit 172, **Baltimore Clipper,** length 23", Pirate Brig., **$24.95**

F. Kit 165, **Sovereign of the Seas,** length 24", 1852 Clipper Ship, **$24.95**

G. Kit 171, **Sea Witch,** length 27", Clipper Ship, **$24.95**

SCIENTIFIC MODELS INC.
340GH Snyder Avenue
Berkeley Heights, N. J. 07922

AMERICAN
aircraft modeler
VOLUME 78, NUMBER 8 AUGUST 1974

COVER PHOTO

Posed with a Pacer is Nancy Wavra. This pattern ship, designed by Owen Kampen, is featured on page 27 of this issue. Photo courtesy ACE R/C.

Page 19

Page 43

Page 51

MODELS

FEATURES

PHOTO ESSAY

WHERE THE ACTION IS

DEPARTMENTS

ACADEMY OF MODEL AERONAUTICS

A substantial discount for a subscription to **American Aircraft Modeler** is offered to members of the **AMA**. Write directly to the **Academy of Model Aeronautics** for further information.

Handcrafted quality, plus 8 channels for the price of 6

Buy and build a Heathkit "405" 8-Channel System and you get the same handcrafted quality that goes into your models — plus you save money two ways. First, there's the traditionally low Heathkit price, second, we knock another $34.90 off the individual component prices when you order a complete system. You end up with an 8-channel system for what you would normally expect to pay for a quality 6-channel rig!

Heathkit "405" Systems put 8 channels — in either single or dual-stick format — in a package no bigger than conventional full-house transmitters. An exclusive IC encoder makes it possible. And there's a Heath-designed IC decoder in the matching receivers to trim size and weight there too!

The thin-profile lightweight aluminum cases are covered in blue vinyl with no exposed fastenings to get in the way. Both transmitters have a two-position switch for landing gear, finger adjust tabs for auxiliary channels; trainer link jacks and "buddy button"; external charging jack for simultaneous charging of receiver transmitter and receiver batteries; eight range controls for adjusting servo travel. Our GDA-405-2 eight-channel receiver weighs just 2.5 oz. yet includes a new built-in connector block.

Choose either single or dual-stick control in 27, 53 and 72 MHz — with adjacent channels at no extra cost. To qualify for systems discount select either Single Stick (GDA-405-S) or Dual Stick (GDA-405-D) Transmitter with your Heathkit 8-Channel System. Includes GDA-405-2 Receiver, GDA-405-3 Battery Pack, and any four servos (either GDA-405-44 Miniature or GDA-505-44 Sub-Mini). Heathkit 8-Channel Systems include all batteries.

Complete Single Stick System **$279.95***
Dual Stick System **$259.95***

Send for your FREE '74 Heathkit Catalog — world's largest selection of electronic kits

HEATHKIT ELECTRONIC CENTERS
Units of Schlumberger Products Corporation
Retail prices slightly higher.

ARIZ.: Phoenix; CALIF.: Anaheim, El Cerrito, Los Angeles, Pomona, Redwood City, San Diego (La Mesa), Woodland Hills; COLO.: Denver; CONN.: Hartford (Avon); FLA.: Miami (Hialeah), Tampa; GA.: Atlanta; ILL.: Chicago, Downers Grove; IND.: Indianapolis; KANSAS: Kansas City (Mission); KY.: Louisville; LA.: New Orleans (Kenner); MD.: Baltimore, Rockville; MASS.: Boston (Wellesley); MICH.: Detroit; MINN.: Minneapolis (Hopkins); MO.: St. Louis; NEB.: Omaha; N.J.: Fair Lawn; N.Y.: Buffalo (Amherst), New York City, Jericho, L.I., Rochester, White Plains; OHIO: Cincinnati (Woodlawn), Cleveland, Columbus; PA.: Philadelphia, Pittsburgh; R.I.: Providence (Warwick); TEXAS: Dallas, Houston; WASH.: Seattle; WIS.: Milwaukee.

HEATH
Schlumberger

HEATH COMPANY, Dept. 80-8
Benton Harbor, Michigan 49022

☐ Please send FREE Heathkit Catalog.

☐ Please send model(s)._____

Enclosed is $_____ plus shipping.

Name_____

Address_____

City_____ State_____ Zip_____

*Mail order prices; F.O.B. factory. RC-106

Modeler's Bookshelf

by James Nordhoff

THE DELTOID PUMPKIN SEED
by John McPhee
Farrar, Straus & Giroux
186 pages

If you think that an aerobody is Racquel Welch in a stewardess uniform, think again. It's really what a computer came up with when asked to design what amounts to an aerodynamic dirigible. And it's also the subject of a fascinating book.

The Deltoid Pumpkin Seed covers the entire development of this interesting alternative to the airplane. The first successful tests of the concept were flights made by a 20" rubber-powered indoor model built from a sketch by a professional model-builder at Princeton University, named John Kukon. He's also a pretty hot CL speed flier who set two national records in one week, and has won over 350 trophies during his career.

The next stage was Aereon 7, a seven-foot foam and silk RC plane, whose first flight ended under the wheels of the photographic chase car. After repairs, it soared to 40' before spiralling in and rekitting itself. But this failure provided enough data to go full-scale, with a 26' piloted vehicle.

At first, Aereon 26 could fly only on the ground cushion and moved sedately along the runway at a towering 15 feet. This version was built just to test the deltoid configuration, so it carried no helium and flew aerodynamically on its 92-hp engine. With the installation of a specially-designed, hand-carved prop, it escaped its own ground effect and made many successful flights.

It achieved its highest status when the pilot radioed the NEFAC tower to warn them that his craft couldn't stand the wake of an approaching Starlifter. The tower called off the huge intruder, explaining, "The traffic on your left is an aerobody, a wingless vehicle." To the men who worked so long, so hard on the project, this seemed to somehow make things official.

As you read John McPhee's book, it's impossible not to share the excitement which brought together the strange cast that peoples the aerobody project. Presbyterian ministers, L-T-A men cut loose from their moorings when the Navy dropped its airship program, aeronautical engineers, inventors, modelers. . .a thoroughly intriguing group. By weaving some of the past into his account of present efforts to defy gravity, McPhee has produced good reading for anyone interested in flying.

But the book offers even more to modelers, touching on indoor, CL and RC, as it covers a concept now living only in the imagination of a few die-hard dreamers.

Editorial

THE NEW FAI PATTERN: THE FLIERS SPEAK OUT.

by Patrick H. Potega

The *1974-75 AMA Rule Book* defines a new schedule of maneuvers which replaces the Class D sequence. This is the program which is officially endorsed by the Academy for top level competitions. . .these maneuvers will be flown at the NATS in August. Of course, the new pattern will also be flown at the Masters Tournament, where the final selection of the USA's International Team is made.

The significant changes in the aerobatic sequence include the addition of three new maneuvers: the Eight Point Roll, Rolling Eight, and the Running Eight. Of the sixteen maneuvers, three others have been "redesigned." The Figure M now requires half rolls on the way up, and on the way down, for each leg. The outside loops are now done by half-rolling inverted, then climbing into the loops from the bottom (before, one simply tucked under from level flight). The final alteration is that the Top Hat now boasts a full roll on both vertical legs. Another major change makes all maneuvers sequential, i.e., a maneuver must be executed on each pass before the judges; thus, no fly-bys are permitted.*

These changes were a total reshuffle of a pattern which had been flown for the last four years. With any change, there is reaction; and so, too, with the new pattern. **AAM** interviewed some of the top fliers in the country, to get their thoughts on the matter. We spoke to Joe Bridi, Ron Chidgey, George Hill, Phil Kraft, Don Lowe, Jim Martin and Jim Whitley. While obviously not a national majority, these fliers have had a significant impact on competitive standards and pattern flying.

AAM: *What are your feelings about flying the new FAI pattern as the official NATS event this year?*

Whitley: I have advocated, for several years now, that whatever the world pattern is—whatever the rest of the world is flying—is what we should fly. If we are going to compete on a world level, we need to practice what the rest of the world is practicing.

Chidgey: I'm highly in favor of that. It's going to be pretty tough to become proficient flying the new pattern before the team selections in October. I'm in favor of as much competitive exposure as possible.

Kraft: For the Nationals, in as much as we don't have anything better, it's probably the right pattern to fly. I don't like the pattern, but that's neither here nor there. It's not a well-balanced pattern, and I don't think that it represents a step forward. It is more difficult, which is in its favor. I don't think that the pattern you fly makes any difference. The good fliers can fly either pattern.

Bridi: I think it's the only way to go. If we're going to fly International competition, then we'll have to fly it at the Nationals—and everywhere. I think that the new pattern will help, because a certain amount of change is necessary from year to year. It's necessary to keep up interest. I have to set up my plane a bit different, and move a few things around. It helps. . .it brings new interest into the style.

Martin: First off, I feel that the United States should have their own pattern. We should lead, rather than follow. If we are to be the followers(and not the leaders) then all contests should use one pattern. I don't like the new FAI pattern; I don't think it's really what we should have.

Lowe: I think that we ought to drop Class C, and use D. A lot of people feel that way. There's a lot of discussion about dropping Class C, and using D as the top AMA pattern. There's talk of possibly substituting Jerry Nelson's biplane event for C. Of course, you could just leave C and add another event, but we're really getting a proliferation of events.

Hill: The FAI pattern is what we'll be flying at the Masters Tournament and, consequently, in the next World Championships. The pattern has been changed enough that, if we try to force our top fliers to compete with our old C pattern, and then try to make ready between August (the NATS) and the Masters, I don't think that (within those 45 days) very many can change over that quickly.

AAM: *Is the FAI pattern, as it is currently defined, a reasonable expression of what is often referred to as the American style of flying?*

Chidgey: It's probably closer to the American style than the old pattern. Most of the maneuvers are going to require placement further out from the pilot, and larger maneuvers (which is the American style), as opposed to the European style, with smaller maneuvers, placed closer. I think that it's going to force the Europeans to open their pat-

terns up a little bit, which will make them more like ours.

Don Coleman and myself proposed a new pattern, to both the AMA and FAI, in which a list of maneuvers was specified, from which the pilot could pick those he wanted to do. He could also specify the sequence in which he wanted to do them. The sport of radio control aerobatics has really matured to the point where we should allow the pilots a little freedom of expression.

Bridi: It's more of a European than American style. The American style is a lot faster, more wide open. The European countries don't have so much wind to contend with; therefore, we have to worry about an airplane that penetrates and goes faster.

Hill: The American style of flying is not really that well defined, and yet it's very simple to define the European style, because everyone over there flies FAI. Therefore, all the European countries have basically the same style—they all look exactly alike. I think that, if you can find anything that typifies the American style, it would be that desire to do something different. It's having your own personality in your flying, and this is one of the hardest things in the world to do when you're trying to fly the FAI pattern.

In the last three world competitions, it seems that, no matter what we've done, we've been outflown. At least the judges said that we were outflown. I don't know if flying the new pattern will actually help, but it's a better option than flying Class C in preparation for international competition.

Lowe: In Class D, the style used internationally gew largely out of what we've done in this country—tempered and tailored by international competition. It certainly represents what our type of aircraft are capable of doing.

Whitley: I don't know what the American style of flying is. People tend to judge what is right and what is wrong, as far as sizes, distances and techniques of maneuvers are concerned, by those who are in the winner's circle. Giezendanner had a tremendous influence in Europe because he won. Matt and Prettner patterned their style after him, as far as the use of throttle is concerned. We found out, when the show was about half over [at Gorizia, Italy, scene of the '74 Internats] that this is what you do to get points.

In this country, in the last few years, the more speed you had, the more wide open you could get your airplane going, you seemed to pick up more points.

Martin: Negative. I don't believe so. Each flier has his own style. I believe that the FAI pattern limits everybody—they have to do it the way it's described to them. It leaves no room for expression. The Europeans are going to run into the same situation. When I was in Europe, I saw fliers with a lot of style. They will be repressed also. I really don't think much of the new pattern, as far as the style goes—it's not American, it's not European. It's a compromise.

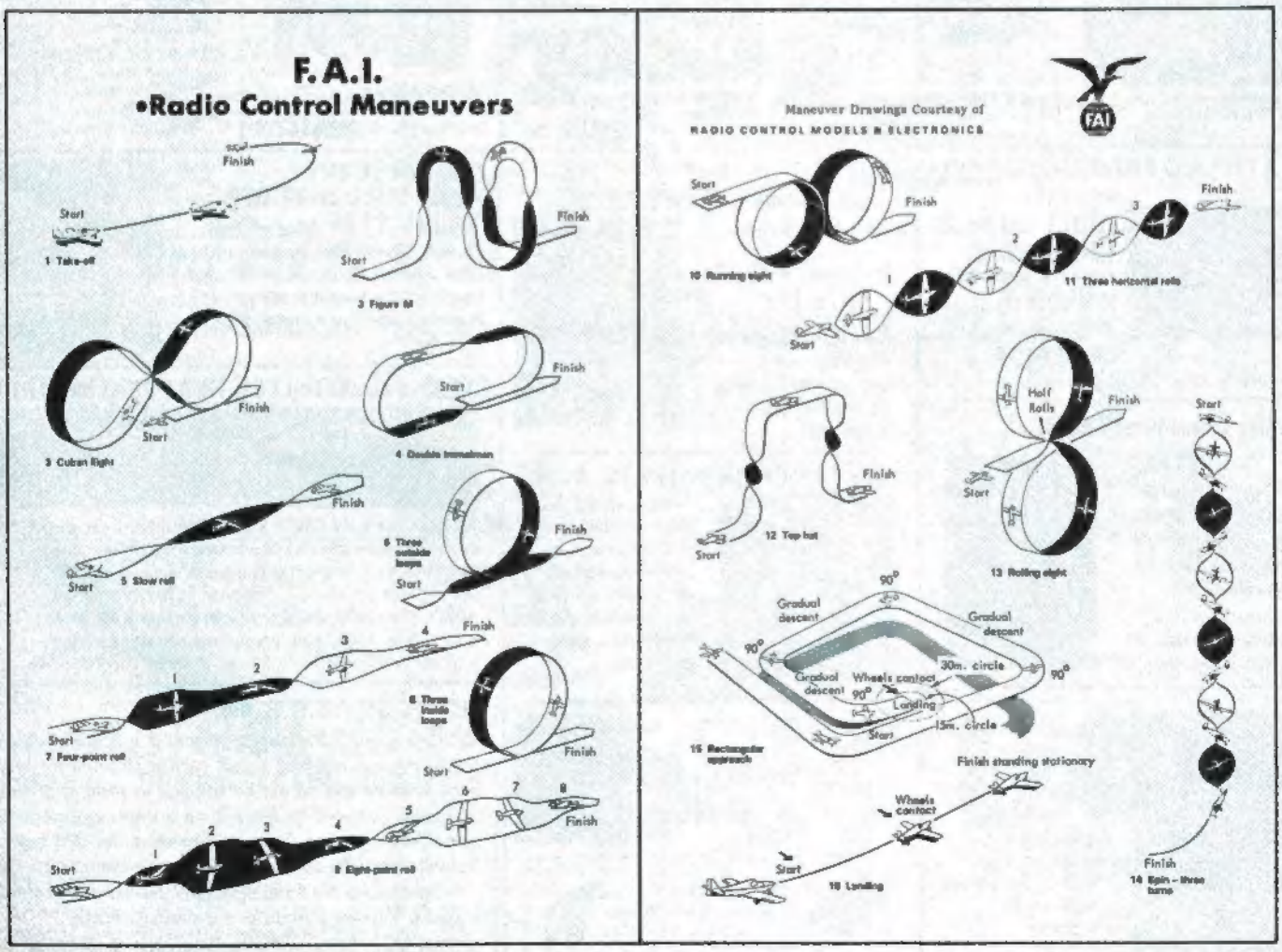
Kraft: I don't think that we have an American style of flying. That's a complete, tall, absolute misconception. There isn't any American style—that's ridiculous, that's a cop-out.

AAM: *What impact will the FAI pattern have on design philosophy and aircraft technology?*

Martin: I feel that the power-to-weight ratio and speed in my present model [Banshee] is more apt to show itself in this new pattern. You are going to find some people who believe that a slower airplane—one that will turn tighter—will be better. Some are going to go to the other extreme and opt for a fast flying airplane that will do the Top Hat. You'll find a lot of people designing airplanes around two maneuvers. That's the Figure M and the Top Hat. I think that's a mistake.

Kraft: I fly, as you know, in full-scale aerobatics, and I recognize the complexities involved. But that's the only true test of airplane and pilot. You must fly a system which requires the aircraft to do maneuvers of all types. In other words, it's not a single snap roll in any model airplane contest that determines the winner. The fliers think that they

(Continued on page 85)



SAVE $$ ON THESE MATCHED COMBINATIONS

(Prices in effect until August 15, 1974)

Ace ALL STAR BIPLANE 34" foam wings and Fox 15 R/C Engine
Total list value $42.90 PRICE $30.00

Lanier SPRINT 25 A-R-F and Fox II R/C Engine
Total list value $71.90 PRICE $49.00

Top Flite HEADMASTER and Fox 15 R/C Engine
Total list value $45.90 PRICE $32.00

Lanier COMET II A-R-F and Fox EAGLE 60 R/C Engine
Total list value $121.90 PRICE $79.00

Midwest (all foam) CESSNA CARDINAL A-R-F and Fox 15 R/C Engine
Total list value $45.90 PRICE $31.00

Bridi RCM TRAINER 40 and K&B 40 R/C Engine
Total list value $87.95 PRICE $66.00

Marks WINDFREE GLIDER and 2 rolls T/F SUPER MONOKOTE
Total list value $56.15 PRICE $38.00

Bridi SUPER KAOS 40 and K&B 40 R/C Engine
Total list value $89.95 PRICE $68.00

Marks WINDWARD GLIDER and 1 roll T/F SUPERMONOKOTE
Total list value $38.05 PRICE $27.00

Bridi RCM BASIC TRAINER and Fox 19 R/C Engine
Total list value $55.90 PRICE $40.00

CONTROL LINE COMBOS

Sterling RINGMASTER and Fox 35 Stunt Engine
Total list value $29.90 PRICE $23.00

Sterling RINGMASTER, .35, and Fox 15 Stunt Engine
Total list value $22.90 PRICE $18.00

Sig KADET 57" and Fox 19 R/C Engine
Total list value $51.90 PRICE $41.00

Sig KOMANDER 62" and K&B 40 R/C Engine
Total list value $77.50 PRICE $61.00

Sig PIPER J-3, 72" and Fox .35 RC Engine
Total list value $56.90 PRICE $47.00

Midwest GAS LITTLE STICK and Fox .19 RC Engine
Total list value $51.90 PRICE $37.00

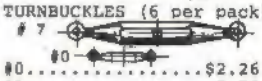
Midwest LITTLE "T" GLIDER and 1 roll TF Super Monokote
Total list value $528.05 PRICE $20.00

Midwest STRIKEMASTER and Fox .36 RC Engine
Total list value $72.90 PRICE $51.00

U-K CHEROKEE BABE and Fox .36 RC Engine
Total list value $61.90 PRICE $44.00

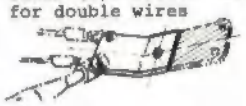
PROCTOR SCALE ACCESSORIES ...MORE TO COME

TURNBUCKLES (6 per pack)



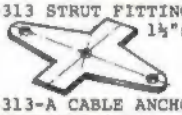
#0	$2.26
#1	2.70
#2	2.75
#2C (clevis end)	2.80
#3	2.85
#3C (clevis end)	2.90
#5	2.95
#5C (clevis end)	3.00
#6	3.05
#6C (clevis end)	3.10
#7	3.15
#7C (clevis end)	3.20

#209 CABLE ANCHOR FITTINGS (4)..... 80¢ for double wires



#312 SWAGE FITTINGS (20)..... 90¢

#313 STRUT FITTINGS (4) 1½"scale 85¢

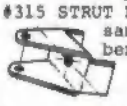


#313-A CABLE ANCHOR FITTINGS (4) 75¢

#313-B STRUT FITTINGS NARROW (4) 90¢

#314 STRUT FITTING (4) same as 313, bent.... $1.00

#315 STRUT FITTING (4) same as 313, bent.... $1.30



PRATHER'S PRODUCTS

Here's a whole bunch of new accessory items - most are unique:

PRATHER
DRILL JIG $4.95
(specify engine: Veco 19, K&B 40 STG 60, STG 21-35-40-46, HP 61, OS 60, OS 40, Webra 61 Blackhead, Enya 60)

Prather Transmitter Cover
$3.98

You see more ratty looking transmitters. After all, the thing's worth from $100 to $200 bucks. Why not stow it in this rawhide vinyl bag that has a zipper top?

Prather SUN SHIELD $2.98

Looks kind of strange on your antenna, but serves a most useful purpose.

Prather NOSEWEIGHTS

1 oz. Nose Weight $1.79
2 oz. Nose Weight $1.99
Fits right behind the prop nut - replaces the prop washer. Sort of a heavy prop washer for quick balancing.

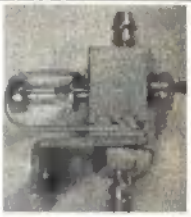
Prather STICK ON WEIGHTS $1.98

Simply sticks into position. Easily broken into ¼ oz. and ½ oz. increments. It occurred to me that it might double as a glider nose skid?

Prather FLUSH CAMLOC 98¢

CALL US FOR FAST C.O.D. or CREDIT CARD SHIPMENTS
Area Code 615-834-2323

COMING SOON! Tatone FUEL SHUT OFF VALVE $4.95 Wire tripped plunger shuts off engine instantly at your control. Easily attached anywhere with adjustable mounting lug. Precision machined metal. Weighs only ¼ oz.



NEW! in stock! Top Flite HEAT SEALING IRON

At last - the EXACTLY RIGHT iron for heat shrink covering materials like Monokote, Solarfilm, Coverite. The point is exactly the small size needed for sealing and shrinking monokote in hard-to-get-to places like inside engine compartments. Our price on the Top Flite Iron is less than the price of the popular Sealector Iron. Please write or call for price.

TRY US OUT: S.W.R. did.

... "I sent your company an order for a Hobby Lobby 5 R/C set and received a post card saying the set was back ordered and would be shipped as soon as it was available. I settled in for a 2 or 3 week wait. You'd better believe I was flabbergasted when the UPS truck brought the radio to my house the next day.

Thank you for running your business in this good manner. You are a credit to the model industry.

S.W.R., Spokane, Washington

Series III

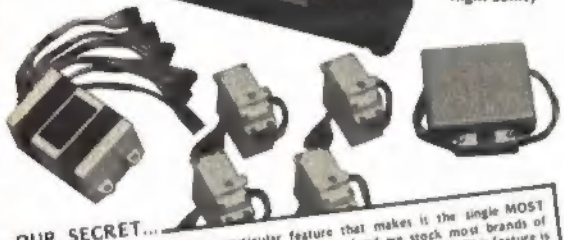
HOBBY LOBBY 5
Digital Proportional

We're afraid to change it!

- Unsurpassed reliability
- Extremely Long Range
- Full 90 day Warranty backed by the manufacturer and by Hobby Lobby
- Smallest, Lightest, Servos made
- A Complete system; Transmitter, Receiver, 4 servos, all n-cads, charger, 27 or 72 mhz
- Extra servos cost only $13.00
- I. C. FULL-POWER servo amplifiers
- Only 11 ½ oz. airborne weight

Series III
HOBBY LOBBY 5
Digital Proportional
$209

- Reliable Airborne battery pack with ONE-CELL-OUT flight ability

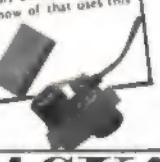


OUR SECRET...

The Hobby Lobby 5 has one particular feature that makes it the single MOST RELIABLE digital proportional in our experience (and we stock most brands of digitals, so we figure we've got a pretty good basis for comparisons). This feature is that the SERVO amplifiers are housed inside the RECEIVER in the Hobby Lobby 5, instead of inside the servos themselves. As the servos are the only components (besides the switch) that are tightly fastened to the vibrating airframe they are subject to vibration-induced breakage in every single solder joint. All other brands of radios have as many as 80 solder joints inside EACH SERVO. But the servos for the Hobby Lobby 5 have only 8 internal solder joints. The other solder joints for the servo amplifier are inside the more shock-protected receiver.

Knowing of the high reliability of the Hobby Lobby 5 servo system we can't understand why EVERY digital proportional doesn't use this obviously better servo amplifier idea, but, as it stands now, the only radio system we know of that uses this sensible system is the Hobby Lobby 5.

P. S. This servo amplifier system has another nice fringe benefit. Since it contains no expensive amplifier, a Hobby Lobby II servo only costs you $13.00

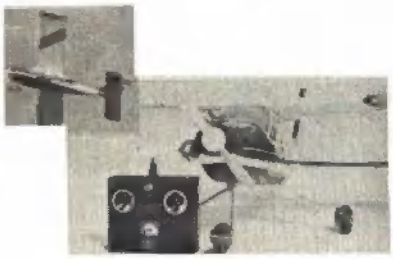


"Innards" of a H/L 5

NEW! MRC's READY-TO-FLY CESSNA 177 with RADIO

List price $475.00
HOBBY LOBBY PRICE $359.00

55" span nicely painted and striped scale Cessna with Enya .35 engine, and MRC Mark V radio (5 channel with 4 servos) all installed and ready to fly (well, about an hour's work is needed).



NEW! GMP "ZIP" (Model Engine Additive) 98 ¢

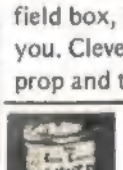
Squirt into carburetor air intake and Zip cleans carbon out of the engine.

NEW! Kraft GLOW PLUG ANANYZER
$7.98

Attaches to top of a dry cell starting battery. ANALYZER has on-off switch and meter that measures current flow through the glow plug and will indicate a burned out or shorted plug, battery condition, or engine flooding.
Two types: Model GPA-R for round battery
Model GPA-S for square battery

NEW! Hoja "CADDY" $2.98 (*cardboard field box*)

If you're not too status - conscious and don't mind being the only guy at the RC field with a cardboard field box, this 14" x 16" box is just the thing for you. Cleverly laid out with a transmitter slot and prop and tool holder.



NEW! Midwest Products LIGHT DEX $5.49 (20 oz. can)

Formulated by modelers, this is the first contact cement that didn't begin its career as a non-modeling product.

Solarfilm *IS BACK!*

26" wide rolls, 6 feet long. No limit.

- OPAQUE COLORS—Bright Red, Dark Red, Orange, Yellow, White, Silver, Tropic Blue, Midnight Blue, Black.
  List Price $7.50 per roll. **PRICE $4.44 per roll.**
- TRANSPARENT COLORS—Transparent Red, Transparent Orange, Transparent Yellow, Transparent Blue.
  List Price $8.25 per roll. **PRICE $5.44 per roll.**
- METALLIC COLORS—Metallic Red, Metallic Green, Metallic Gold. List Price $9.75 per roll. **PRICE $6.44 per roll.**

BRAND NEW! VOLUME III **HOBBY LOBBY ILLUSTRATED CATALOG $2.00**

MORE goodies, MORE photos, MORE of the LOWEST DELIVERED prices in the R/C Hobby!

HOBBY LOBBY'S COMPLETELY **Ready-to-Fly** 3 CHANNEL AIRPLANE

Ready Bird 23
$19900

The READY BIRD 23 is an almost fully assembled Lanier airplane with an EK Products "Little Red Brick" 3 Channel digital proportional system. INSTALLED...

SPECIAL PRICE $177.00 (limited quantity)
until July 30, 1974

...batteries...
FULLY INSTALLED
AND ACTUALLY READY
FOR YOU TO FLY!!!

Since we couldn't fit the fully assembled plane into a box you must glue the two wing halves together, and glue the tail to the fuselage. But, this only adds up to about 23 MINUTES WORK, and then you put batteries into it, gas 'er up, and GO FLY IT!!!

CALL **(615) 834-2323**

FAST C.O.D. OR CREDIT CARD SHIPMENTS.

We like telephone C.O.D. and Credit Cards. Sure, they call for a bit more paperwork on our part, but we like the feature that we can tell you what we have in stock, andwe like the idea that we can generally ship out these orders on the same day you phone them in. There's no delay of waiting for your letter orders to reach us. Phone calls are quick and they're cheap - so call us!

HOBBY LOBBY INTERNATIONAL

Route 3, Franklin Pike Circle, Brentwood, Tennessee 37027 - 615/834-2323

DROP YOUR ORDER IN THE MAIL BOX. THEN JUMP BACK BECAUSE WE SHIP FAST!
WE PAY POSTAGE (in U.S.) on all orders accompanied by check or money order.
Satisfaction guaranteed or money refunded.
Phone 615/834-2323 Store Hours: 9 a.m. - 5 p.m. except Sundays.

Modeler Mail

The Evolution of a Species

In the June '74 issue of **AAM**, on pages 16-17, I see a model with a name, a shape, and a construction method, all indicative of a Dave Gierke design. However, he receives no credit. How come?

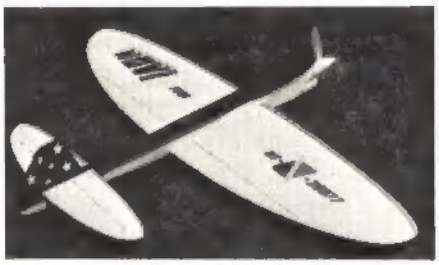
Dr. William Nakashima
Yuba City, Calif.

While reading through your June issue, I took special interest in the Novi Arrow article. I kept looking for some mention of Dave Gierke's Novi IV CL stunt ship, as featured in the May '70 issue of *MAN*.

Hoping not to detract from the recognition Mr. Brink deserves for his beautiful model, I do feel Dave Gierke should be given credit for the original design concept and construction methods used in the Novi Arrow. A quick comparison of the two articles will illustrate my point. As more and more RC fliers join the competition ranks, we will see many sleek control line models redesigned for pattern flying. I think it's great, but let's give credit where credit is due.

Les McDonald
South Miami, Fla.

Gierke's Novi Four



Brink's Novi Arrow.

Indeed, the similarities would make almost anyone cry plagiarism! However, a more studied examination shows that parallel developments have occurred. Both models use logical and proper construction methods, both models evolved from similar theories and principles of aerodynamics.

It's hard to pin down influences in this hobby (after all, they still all resemble Tauruses, in a way), but the mutual interchange of ideas, the subtle buried thought after reading about someone else's model, are all germain to the creative processes of a designer.

In a future editorial, we'll look into a distasteful situation—guys who win trophies and prizes with other peoples' models.

—Editor

For Your Information

I am having a problem out here in Southern California. I have written to many control line clubs in order to find some control line contests out here. If there are any California readers out there, who are members of these clubs, or who know where and when control line contests are being held, please write to me and let me know.

Joel Quisenberry, Jr.
5841 Snead Drive
Huntington Beach, Calif.

Have you checked Competition Newsletter, *a great bimonthly publication put out by the AMA? All sanctioned contests are listed therein.*

—Editor

Is it a Bird. . .Is it a Plane?

Your interesting Editorial in the June issue, recalled my own efforts in model building at my personal "end of the world" in 1967. I was on Johnston Atoll, a one square mile chunk of coral, about 700 miles on the other side of Hawaii. Securing model supplies meant riding an air force C-124 to "town" (Honolulu) and back. So, it was expedient to build long-lasting models.

The main hazard to my sturdy Guillow "Rat Racer" was seagulls. They must have been the most curious birds ever. They would swoop at the flying model, and zoom at it when the landing roll ended. My helper actually feared picking it up until the birds (ten to twenty of them) went away. It was no surprise when the model flew into a bird (or was it the other way around?). Anyway, the engine stopped at the same instant the prop hit the bird. I was able to dead stick the ship in okay, and then looked back to the area where the bird strike occurred—the dopey bird was on the ground, staggering around, while feathers still descended. No J.L. Seagull this, he departed on wing, barely, no doubt cussing Duke Fox and the engine he built.

The hand launched glider that landed in the Pacific wasn't much better off!

David Kingman
Ft. Walton Beach, Fla.

SuperStar

Thanks for the SuperStar article (Mitch Poling, April **AAM**). I've built six

(Continued on page 106)

papi Potomac Aviation Publications, Inc.
733 15th Street, N.W.
Washington, D.C. 20005

EDWARD C. SWEENEY, JR.
President and Publisher

PATRICK H. POTEGA
Editor

ERIC W. MEYERS
New Product Editor

J. ALLEN MILLER
Copy Editor

Contributing Editors
JOHN BLUM
BILL BOSS
JOHN BURKAM
PAUL DENSON
MONTY GROVES
PATRICIA GROVES
DON LOWE
FRED MARKS
CARL MARONEY
CLAUDE McCULLOUGH
LEW McFARLAND
JIM McNERNEY
BOB MEUSER
WALT MOONEY
PAT MURPHY
CAS PELS
MITCH POLING
JOHN SMITH
BOB STOCKWELL

DOUGLAS H. BOYNTON
Advertising Sales Manager

SANDRA B. CYMROT
Advertising Production Manager

GRETCHEN KNOWLES
Subscription Manager

MARK K. WINTER
Subscription Assistant

WILLIAM P. KOCHANSKI
Computer Compositor

CAROLYN A. MUNSON
Art Associate

LOIS E. HOOVER
Art Associate

HARVEY E. CANTRELL
Business Manager

ABDUL M. SAYEEDI
Assistant Business Manager

Published monthly by **Potomac Aviation Publications, Inc.**, 733 Fifteenth Street, N.W., Washington, D.C. 20005. Edward C. Sweeney, Jr., President; Walter L. Hulstedt, Treasurer; Harvey E. Cantrell, Business Manager and Secretary.

ADVERTISING DEPARTMENT: All advertisers' orders and correspondence to 8001 Forbes Pl., Suite 210D, Springfield, Va. 22151. (703) 321-7745. **TRUTH IN ADVERTISING: AAM** will not knowingly insert advertisements from other than reliable firms. **SUBSCRIPTION RATES:** In U.S., Possessions and Canada, 1 Year $12.00; 2 Years, $23.00; 3 Years, $35.00. Elsewhere $14.00 for one year. Six weeks are required for change of address. In ordering a change, write to **American Aircraft Modeler**, 733 Fifteenth Street, N.W., Washington, D.C. 20005. Give both new and old address as printed on last label. Manuscripts, photographs and art materials are welcome and will be carefully considered. Article and photo specification sheets are available to potential contributors upon request. Postage must accompany all submittals if return requested. Contributions are assumed to be exclusively the property of **AAM**. All rights reserved. Nothing may be reprinted in whole or in part without written permission from the publishers. We cannot accept responsibility for unsolicited manuscripts or artwork. When writing the editors, address letters: Editorial Office, **American Aircraft Modeler**, 733 Fifteenth Street, N.W., Washington, D.C. 20005.

POSTMASTER: Send Form 3579 to **American Aircraft Modeler**, 733 Fifteenth Street, N.W., Washington, D.C. 20005.

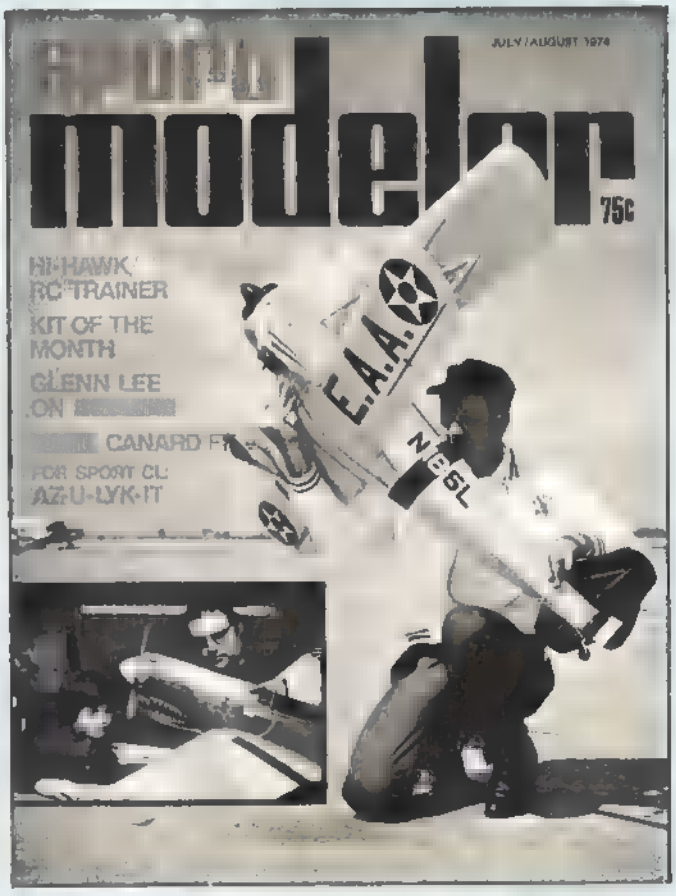
Second class postage paid at Washington, D.C. and at additional mailing offices.

For the fun of it...

If you build and fly model airplanes for the fun of it **SPORT MODELER** magazine is for you. Each issue is written to help your modeling to be easier, more original, more interesting and more fun. At last ■ magazine written for the sport modeler.

Sport Modeler features:

- Original sport designs and plans
- How to do it building tips
- Informative detailed construction articles
- New product information
- Reviews of outstanding sport kits
- Future articles will explore engines, radios, covering, flying and much more



Order today so you don't miss ■ single issue. Send the attached order card to **SPORT MODELER MAGAZINE**, 733 Fifteenth Street, Washington, D.C. 20005

SPORT MODELER is the ■ name and concept for Junior American Modeler magazine. If you now have a subscription to Junior American Modeler you will recieve **SPORT MODELER** starting with the July / August issue. **SPORT MODELER** will be published bimonthly in 1974 and monthly starting in 1975.

OUR FIRST AND MAYBE LAST SALE!

Look what a penny will buy!

Our first and maybe last Penny SALE from . . . .

Capt'n H. Shack

YOU PAY NOT

1¢ MORE

FOR C.O.D. or CHARGECARD!

Call (714) 522-4921 for the quickest and easiest ordering at the 'Shack'!

master charge BANKAMERICARD welcome here

C.O.D. OR CHARGECARD

SEMI-SCALE CITABRIA

Only $13.99

SPAN: 43"
AREA: 290 Sq.
ENGINE: .049-.10-.15

+ 1¢ MORE YOU GET

VACUUM FORMED WHEEL PANTS
Retail $2.50/pair

VolksKit

SPAN: ■ in.
ENGINES: .051—.10 —.15
■■■ 348 sq.in.
RADIOS: ■ to 3 channels.

SureFLITE

Sale $19.99

+ 1¢ MORE YOU GET

1 (ONE) ROLL / Choice of color FLITE-KOTE Retail $7.50 value!

DU-BRO PROP BALANCER

Only $2.95

+ 1¢ MORE

Dubro tank filter 95¢value

GRAUPNER Hi-Fly

Wing Span: 90½ inches.
Length: 40½ inches.

$39.99 Special

+ 1¢ MORE YOU'LL GET 2 (TWO) rolls of FLITE-KOTE

10 ROLLS OF FLITE-KOTE for $4.70

Choice of ■ colors — retail price $7.50/r

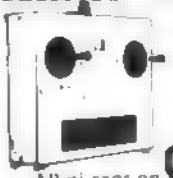
STRONG, FAST and LIGHT!

+ 1¢ MORE YOU GET

HEAT GUN

You get the Hobby Shack Heat Gun with 10 rolls of Flite-Kote (choice colors) Heat Gun is a $20.00 value

Super Sport 4 Radio Control



■ CHANNEL
2 STICK
■ SERVOS
SYSTEM

$189.00

All ni-cads on 27 or 72 MHz.

+ 1¢ MORE YOU GET

The Very Popular RCM FLIGHT TRAINING COURSE $10.00 Value.

New BRIDI .40 TRAINER

Son of the RCM Trainer!

Son of the RCM Trainer for .40 engine size flying. Save on gas but not on fun and thrills with this .40 Kit! RETAIL $42.95

Only $33.99

You Get ONE (1) LARGE DEVCON A $2.25 VALUE!

CIRRUS

Molded fuselage shells

+ 1¢ MORE

You get 2 (Two) rolls of FLITE-KOTE a $15.00 Value!

Only $49.99

.35R/C

O.S. Engines

$27.99 retail $32.98

+ 1¢ MORE

You'll get a glow-plug caddie plus 2 (Two) Thunderbolt R/C long plugs. $3.56 Value!

COX 049TD

+ 1¢ MORE $10.99

A Cox glow plug CLIP

The REAL THING

Try it, . . . you'll like it

Greatest fun flyer ever for the sport flyer

All balsa kit

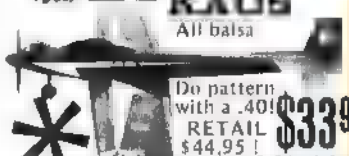
Only $11.99 46" span .049-.10 engines.

+ 1¢ MORE

YOU GET THE BRAND NEW Hobby Shack NOBIG thing KIT

New ■■ KAOS

All balsa



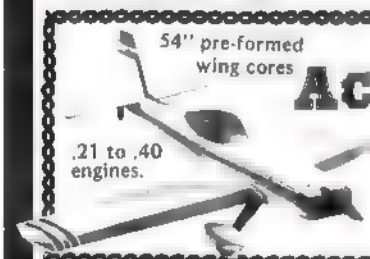
Do pattern with a .40! RETAIL $44.95!

$33.99

+ 1¢ MORE 1 large DEVCON

SPINKS ACROMASTER

54" pre-formed wing cores



.21 to .40 engines.

Semi-Scale

Only $32.88

+ 1¢ MORE

You'll get the new AHM GUSHER Electric Fuel Pump! Don't miss this extra $12.98 Value!

INSTANT R/C READY MIX

Total Fab instant r/c

(1 HOUR TO ASSEMBLE ■ FLY R/C)

A SUPER, SUPER SAVING

$174.99 + 1¢ MORE

$235.00 VALUE!

Giant Savings!

SPECIFICATIONS

PLANE: 50"span — ARF, assembled !!! RADIO: EK 'LRB' 3 channel complete with 3rd servo !!!,

ENGINE: is the . . FOX 25/R/C mounted in place! + installed; tank, prop, push rods, landing gear ■ hinges, wing covered.

Special

RADIO, ENGINE AND PUSH RODS ■■■ ALL FACTORY INSTALLED!

THUNDERBOLT

R/C LONG GLOW PLUGS

6 for $4.99

+ 1¢ MORE

You'll get a 1½ volt battery glow plug checker $3.95

Very limited amount**

DuBro HORNS

Buy 2 packs 98¢

+ 1¢ MORE

You'll get a 3rd package of DuBro Nylon HORNS Orderly early !!!

Dubro NYLON 12" KWIK-LINKS

BUY 9 for $2.59

1¢ MORE You'll get ■ (three) more Kwik-Links !

6475 KNOTT AVENUE BUENA PARK, CALIFORNIA 90620

+ MORE Hobby Shack®

AHM PROPELLERS

10X6 Hardwood

Buy (85¢ each) 4 for **$3.40**

+ MORE YOU GET 2 (Two) MORE

Big Savings! **10X6** PROPS

AHM GUSHER 1

ELECTRIC FUEL PUMP

Reg. $12.98

$8.99

+ MORE

You'll get 2 (two) R/C Thunderbolt long glow plugs ! a $2.58 VALUE

Selector Iron with custom shoe*

Sale **$15.99**

+ MORE YOU'LL GET ONE ROLL OF FLITE-KOTE !

HINGE POINT DRILL JIG

ROBART

Only **$2.99**

+ MORE a pack of 6 Hinge-Points

Real BIG Thing

7 FOOT SPAN

Only **$54.99**

All balsa, a great trainer

+ MORE YOU GET Williams Bros. 5 inch scale wheels $7.89value

DAVE PLATT T-28 & O.S.60R/C BLACKHEAD

SUPER SCALE COMBO!

Only **$109.00**

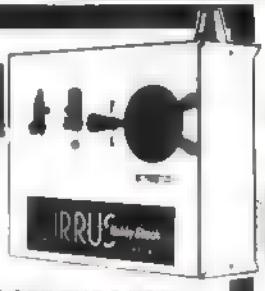
$139.93 VALUE!

+ MORE Devcon 5-minute epoxy & 3 Thunderbolt R/C plug

$6.12 Value!

CIRRUS 3 Channel

3 ch. trans. & 3 ch. rec. + 2 servos. 27-mhz. Single stick.



Only **$89.99**

+ MORE YOU GET THE 9 VOLT TRANSMITTER BATTERY a $2.50 VALUE !

NO BIG THING

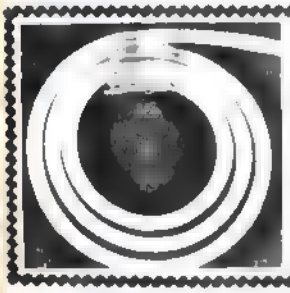
1 channel or FF kit

32"span .010-.020 engines

Only **$5.99**

+ MORE

You'll get one roll of FLITE-KOTE $7.50



XX SILICONE FUEL LINE

It's the best there is!

3'/99¢

+ MORE YOU GET 2 (two) feet more!

THE HOBBY SHACK 1 CENT SALE

*ENDS

AUGUST 20th, 1974

Order Early

Airtronics R/C SPORT ACRO-STAR

Only **$59.99**

+ MORE

50½" wing span /.40 to .60 engines / complete hardware!

You'll get R/C long THUNDERBOLT glow plugs. $7.74 val.

Special GRAUPNER BELL 212 (TWIN JET)

NOW IN STOCK

Call or write Hobby Shack for our special* price and find out what a penny will buy !

Hobby Shack GLOO GUN

The PRICE IS RIGHT

3 for **98¢**

+ MORE YOU GET 2 more Gloo Guns

FLITE-KOTE

Covering material

9 Colors

Fast and Light!

buy 4 rolls for $18.68

Red, Dk.Blue, Lt.Blue, Orange, Yellow, Aqua, Black, White, and Clear.

Retail $7.50 roll (72X2..")

+ MORE YOU GET THE 5th ROLL

Retail value $7.50

MODELER'S CATALOG

Our catalog is packed end to end with modeling kits, tools, accesories, plus engines, radio systems, and supplies. It's over 100 pages long and many pages are in full color. Plus, inside are articles for the the novice to help him (or her) with a few of the basics of modeling.

We feel it's the best catalog in the business and suggest that you include it in your library. Ordering by mail is both fun and easy, plus we're as close as your nearest mail box!

☐ I am enclosing $2.50 (check or M.O.) for your fully illustrated modeler's catalog. Please rush it to me today.

MAIL THIS COUPON TO:

HOBBY SHACK
6475 KNOTT AVENUE
BUENA PARK, CALIF. 90620

Name _____

Address _____

City _____

State _____ Zip _____

AUTHORIZED EK & WORLD ENGINES

RADIO REPAIR CENTER

DON'T MOON IT, . . . TUNE IT !

Don't send your radio to the moon because it's just out of tune, . . . send it to Hobby Shack — soon!

HOBBY SHACK

6475 Knott Avenue Buena Park, California 90620

Vacationers. Visit our

Warehouse Showroom

Come on in and look around!

We invite you to personally shop at our showroom. We shall be here to answer your questions and assist you in making your selections. We are located on Knott Avenue between the Santa Ana Freeway (use Artesia Ramp) and the Riverside Freeway (use Knott ramp). For vacationers, we are close to Disneyland and Knotts Berry Farm.

OPEN 7 DAYS

Monday – Friday	9:00 – 9:00
Saturday	9:00 – 5:00
OPEN SUNDAY	10:00 – 3:00

POSTAGE & HANDLING INFORMATION

$ 0.00 to $ 5.00 add	$ .90	$20.01 to $30.00 add	$2.50
$ 5.01 to $ 8.00 add	$1.00	$30.01 to $50.00 add	$2.75
$ 8.01 to $15.00 add	$1.20	Order over $50.00 add	$3.00
$15.01 to $20.00 add	$1.60		

California residents please add the 6% State Sales Tax.

All prices in this advertisment and in our catalog are subject to change without notice.

ON THE SCENE

1974 MEXICO CITY INTERNATIONALS: If you think Mexican food is hot stuff, you should see what they do to pylon racing. / by Bob & Kathy Root

The Thirteenth Annual Mexico City International Contest (April 11-14) almost didn't happen this year. Two months before the planned date, the previous sponsoring club (Association Mexicana de Radio Control) lost its field. However, the contest was very capably taken over and run by another group, the Club de Radio Control Mercurio. They managed to put on a tremendous bash on very short notice. This contest was an occassion for the Second Annual (we hope) Root "Love-In." This year the entire family migrated south to this fine Easter contest, and a reunion with many friends from last year.

The vacation week started off, for us, with a flight from Seattle to Los Angeles for a weekend stopover to visit Eloy Marez of Orbit Electronics. A pizza party, to meet the very talented people who put together our radios, was first on our busy agenda.

Up early the next morning for a drive to Camp Pendelton for a morning of flying on the most fantastic site imaginable. They have the use of a paved runway (at least 600 feet long) in the middle of a pastoral setting. But, the best part of all was the small number of fliers using the field while we were there (six airplanes all day). Undoubtedly, the most ideal flying conditions we have ever had.

Sunday, and we are off to Mexico City. Our flight was met by our gracious hosts for the week, Joaquin and Olivia Alba. We were lucky enough to find time for two days in Acapulco. Now, that is the way to live. Sunshine and good company. What more can anyone ask for?

Thursday and Friday were devoted to pattern. Because of the initial uncertainty associated with the contest this year, there were less pattern fliers than last year. Approximately 20 contestants competed for two days, with top honors going to Benjamin Castaneda, who took a first in Expert for the second year in a row. His father, Luis, was second; with Silo Feiner finishing a close third. Mach I's were the most popular airplane, with all of the usual engines in evidence.

Saturday saw the start of the racing events. Formula I had 15 eager competitors. Several airplanes were lost to the

(Continued on page 74)


1


2


3


4


5

(1) Although a mediocre photo, this shot really captures the action and competitive spirit of FAI racing. (2) The author's Phoney Folkerts took all the pesos in FAI. He beat another Folkerts! (3) Ricky Rats are popular at the high altitudes of Mexico City—this one by Manuel Davila. (4) You [redacted] make the Folkerts as Phoney [redacted] your fancy suits. Olivia Alba did his up in a Jonathan Livingston Seagull motif. He was second in FAI. (5) Part of the Formula I line-up. Racing is as Mexican as jumping beans. (6) Manuel Sierra cranks his FAI P-51, while G. Mathelin holds. The quality of workmanship shows that these modelers really love racing. (7) The start of an open pylon race. Cram a big engine into a small bird and go. Definitely not a novice event. (8) The co-author, Kathy Root, with Bob's winning Phony Folkerts. [redacted] charming lady. (9) E. Lozano took third in Foluma I with his beautiful metallic blue minnow (he took top handicap points). (10) Pattern was dominated by Mach I's. Benjamin Castaneda, [redacted] here examining his nose gear, took first in Expert. (11) The hardware department was impressive. They do things [redacted] a big way south of the border. (12) E. Lorenzo, in foreground, ready to fly a heat in Formula I. [redacted] was third [redacted] that event, and second in Open Class. (13) Silo Feyner and daughter/caller Rita, with their Open pylon entry. Small models and lots of power make this event a real hair-raiser.

Photos by Bob Root

TOWER

P.O. BOX 778 CHAMPAIGN,

RC POWER KITS . . . .

	RETAIL	TOWER
AIRTRONICS:		
Acro Star	$79.95	$64.75
ANDREWS:		
Minimaster	$32.95	$24.75
H-Ray	26.95	20.25
A-Ray	32.96	24.75
AIRBORNE ASSOCIATES:		
Tiger Tail	$67.50	$55.00
Nutcracker	67.50	55.00
Banshee	67.50	55.00
Hi-Lo	67.50	55.00
Cosmic Wind	67.50	[illegible]
Troublemaker	67.50	55.00
Phoenix [illegible]	67.50	55.00
BRIDI:		
RCM Sportster	$34.95	$26.75
RCM Basic Trainer	29.95	21.95
RCM Trainer	[illegible]	38.25
RCM Trainer 40	42.95	32.25
Super Kaos	[illegible]	44.50
Kaos	52.95	41.00
Super Kaos 40	44.95	33.75
(All wing and fuse kits in stock)		
BUD NOSEN:		
Aeronca Champ	$89.95	$87.50
GOLDBERG:		
Senior Falcon	$46.95	$33.50
Skylane 62	46.95	33.50
Skylark 56	28.95	21.25
Falcon 56	24.95	17.95
Shoestring 54	38.95	28.50
Junior Skylark	10.95	[illegible]
Junior Falcon	[illegible]	8.15
(all wing kits in stock)		
DAVE PLATT:		
Spitfire	$69.95	$46.85
T-28-B	[illegible]	50.95
GEE BEE:		
Islander	[illegible]	36.85
Mallard	44.95	36.95
MK IV Float	19.95	16.50
JENSEN:		
Des Ugly Stick	$55.00	$44.00
J & J:		
Troublemaker	$59.95	$42.00
Eyeball	54.95	38.00
Banshee	[illegible]	38.00
J-Craft	[illegible]	32.00
1/4 Midget Mustang	34.95	25.00
J-Bipe	[illegible]	42.00
KRAFT:		
Wing Master	$29.95	$23.95
Wingmaster Jr.	27.95	21.95
LANIER:		
Sprint 25	$46.95	$34.50
P-51 Mustang	[illegible]	39.75
Caprice	59.95	44.95
Apache	[illegible]	39.75
Hawk	32.95	24.75
[illegible]na	42.95	32.25
Transit	39.95	[illegible]
Jester	[illegible]	44.95
Comet II	51.95	[illegible]
Slo Comet	51.95	[illegible]
Pinto	44.95	33.75
Midget	52.95	39.75
Invader	62.95	47.25
Dart	52.95	[illegible]
(All Lanier are almost ready to fly)		
LONG ISLAND HOBBYCRAFTS:		
Focke-Wulf [illegible]	$55.00	$39.95
Grumman F8F Bearcat	55.00	[illegible]
P-47 Thunderbolt	55.00	39.95
PT-17	65.00	47.25

ALMOST READY TO FLY . . . . the FB 100
from AIR CAPITAL MODELS

INCLUDES:

All controls and pushrods attached, fuel tank and fuel line, landing gear and wheels, spinner, white enamel finish already trimmed. Just add engine and radio!

NOTE: NO C.O.D.'s ON THIS PLANE.

ONLY $87.50 **Span 60"** **Engine .35 to .61**

DAVE PLATT
all new T-28B

Span 65" **Engine .60**
RETAIL $64.95 **TOWER $50.95**

RC KITS
THE SUPER HUNTER II

Span [illegible]" **Engine .60**
Retail $54.95 **Tower $46.75**

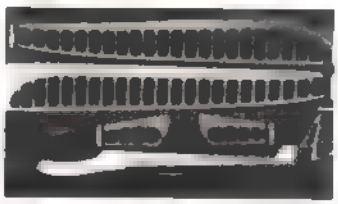
all new from MACO
the "Simplex Trainer"

Span 49" **Engine .29 to .45**
RETAIL $34.95 **TOWER $24.50**

HOBIE MODEL COMPANY
all new HOBIE HAWK

Span 99" **Area 590 sq. in.**

Available in ready to cover form for only $89.00
—OR—
Available ready [illegible] fly already monokoted and painted. Comes in choice of orange, white, or yellow. Only $129.00.



RC KITS
THE U-2 SPY PLANE

Span 70" **Engine .45 [illegible] .60**
RETAIL $49.95 **TOWER $42.50**

NEW FROM WOLFF-PAK

THE TOAD

Span: 50"
Area: 530 [illegible] in.
Engine: .40

RETAIL $39.95
[illegible] $32.50

Exceptional Quality
[illegible] Channel Trainers.

THE TADPOLE

Span: 36"
Area: 288 [illegible] in.
Engine: .15

RETAIL $29.95
TOWER $24.50

MACO:		
"Simplex" Trainer	$34.95	$24.50
Jet Star	57.95	37.75
Vega	55.95	36.50
MARK'S MODELS:		
Bushwacker	$44.95	$35.95
MODEL DYNAMICS:		
Gryphon	$34.95	$28.50
Shriek	55.00	44.75
Power [illegible]	6.50	5.75
MIDWEST:		
Strikemaster	$42.95	$31.95
Cardinal Squire	54.95	37.95
Mach I	54.95	37.95
Chipmunk	24.95	18.00
Cardinal	24.95	18.00
Little Stick	25.95	18.75
Sweet Stick	37.95	27.25
Tri Squire	19.95	14.50
Lil Tri Squire	14.95	11.00
Lil "T" Glider	19.95	14.50
RC KITS:		
F-8-F "Bearcat"	29.95	25.50
The U-2	49.95	42.50
Acro-Trainer	44.95	38.25
Super Hunter - II	54.95	46.75
Hawker Hunter	49.95	42.50
ROYAL PRODUCTS:		
Cessna [illegible]	$69.95	
Focke-Wulf 190	74.95	
Corsair	79.95	
Phantom F4J	69.95	
Cessna [illegible]	[illegible]	
Cessna 182 Jr.	42.95	
B-25 (Twin)	84.95	
P-38 (Twin)	89.95	
Spirit of [illegible]. Louis	[illegible]	
Pitts Special	74.95	
Hein Senior (Tony)	[illegible]	
Hein Junior (Tony)	39.95	
Hayabusa (Oscar)	69.95	
Cessna 310 Q (Twin)	84.95	
Zero	74.95	
Zero Junior	[illegible]	
Spitfire	74.95	
Spitfire Junior	44.95	
Aquarius	69.95	
Super Cherry II	[illegible]	
Piper Colt Sr.	74.95	
Piper Colt Jr.	44.95	
Bleriot XI	49.95	
Cessna Skymaster	84.95	
F8F Bearcat	84.95	
SOUTHERN RC:		
Mustang-X (NEW!)	$59.95	$49.95
Tigertail Standard	69.95	58.00
Tigertail Deluxe	99.50	83.00
Sweetster Standard	69.95	58.00
Sweetster Deluxe	99.50	83.00
Bobcat	52.95	44.00
TIDEWATER:		
Pronto	$21.95	$18.00
Super Pronto	27.95	23.25
TOP FLITE:		
P-51 Mustang	$52.50	$35.50
P-40 Warhawk	54.95	37.50
P-39 Airacobra	54.95	37.50
Kwik Fli III	54.95	37.50
Contender	42.95	29.00
R/C Nobler	34.95	24.00
S.E. 5a	54.95	37.50
Headmaster	19.95	13.95
VK:		
Cherokee	$43.95	$29.95
Navajo	42.95	29.25
Cherokee Babe	29.95	20.50
Super Corben	34.95	24.00
Fokker Triplane	49.95	33.75
Nieuport 17	48.95	33.40

"Call, write, or consult our catalog for our discount price on these Royal Kits."

HOBBIES

ILLINOIS 61820

PHONE TOLL FREE 800—637-6050

ILLINOIS RESIDENTS CALL COLLECT 217—356-4294

WOLFF-PAK

Toad	$39.95	$32.50
Tadpole	29.95	24.50

RC ENGINES . . . .

COX:	RETAIL	TOWER
Tee Dee .010	$16.00	$12.15
Tee Dee .049	16.25	12.35
Tee Dee .09	18.50	14.05
Medallion .15	21.00	16.95
Medallion .09	16.25	12.35
Medallion .049	13.50	10.25
Golden [redacted] .049	10.00	7.60
Babe Bee .049	8.00	6.10

ENYA:

.09 III TV	$22.50	$17.75
.15 III TV	25.25	19.95
.19 V TV	27.50	21.40
.29 IV TV	30.98	[redacted]
.35 III TV	32.98	25.60
.40 TV	62.98	47.75
.46 BB TV	56.25	41.35
.60 III BB TV	[redacted]	58.00
.60 III BB TV G-B	[redacted]	65.00

FOX:

.15 RC	$20.95	$15.50
.19 RC	25.95	19.00
.25 RC	25.95	19.00
.29 RC	29.95	21.25
.36 RC	29.95	21.25
.60 RC Eagle	69.95	47.25
.78 RC	84.95	56.50

H.B.:

.61 RC w/muffler	$130.00	$80.00

K&B:

.35 RC Stallion	23.50	17.75
.40 RC w/Perry	45.00	32.00
.40 RC Schnuerle	82.00	57.50

O.S. MAX:

Pet .099 RC	$ 13.98	$11.75
.10 RC	19.98	15.95
.15 RC	25.98	20.95
.20 RC	27.98	22.95
.25 RC	29.98	24.25
.30 RC	32.98	[redacted]
.30 RC Wankel	87.50	75.00
.35 RC	32.98	26.50
.40 RC	49.95	39.95
.50 RC	59.95	43.95
[redacted] RC Goldhead	74.95	61.00
.90 RC	105.95	[redacted]
.60 RC Blackhead	74.95	61.00

SUPERTIGRE:

G 20/23 RC	$33.95	$28.00
G 21/46 RC	39.95	32.95
ST .60 RC	59.95	[redacted]
G .60 RC Bluehead	74.95	61.00
G .71 FI RC	79.95	64.95

VECO:

19 RC	$38.00	$27.75
61 RC w/muffler	85.00	60.50

WEBRA:

.40 RC Blackhead	$101.00	$64.50
.61 RC Blackhead	134.00	84.00
.61 RC Schnuerle	148.00	95.40
.61 RC Schneurle R.V.	157.00	102.20

YS:

YS [redacted] RC	$146.00	$94.00

NOTE: ENYA AND WEBRA PARTS IN STOCK!

LONG ISLAND HOBBYCRAFTS

the PT-17

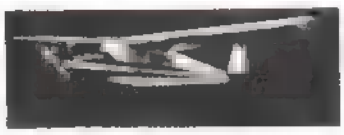
This excellent kit can [redacted] built [redacted] ways: the Army PT-17, The Navy Trainer N2S-3, or as Sammy Mason's famous stunter "Checkers". Everything is furnished including decals for all 3 versions and dummy engine cylinders.

Span: 51" Engine .40 to .60

RETAIL $65.00 TOWER $47.25

ANDREWS A-RAY

LIMITED QUANTITY!



Span 53" Engine .19 to .40

RETAIL $32.95 TOWER $24.75

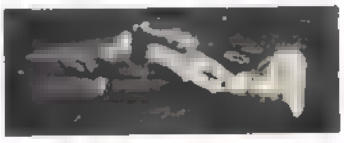
MARK'S MODELS BUSHWACKER

Span 69" Engine .15 to .20

RETAIL $44.95 TOWER $35.95

LONG ISLAND HOBBYCRAFTS

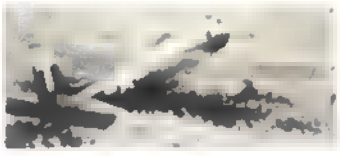
FOCKE-WOLF 190



Span: 52" Engine .40 to .60

RETAIL $55.00 TOWER $39.95

GRUMMAN F8F BEARCAT



Span: 52" Engine .40 to .60

RETAIL $55.00 TOWER $39.95

All prices in this ad are correct as of May 20, 1974.

To determine current availability and price of anything in this ad or in our catalog just call our toll free numbers listed below!

RC KITS

ACRO-TRAINER

Span 68" Engine .40 to .60

RETAIL $44.95 TOWER $38.25

RC GLIDERS . . .

	RETAIL	[redacted]
AFI (ASTROFLITE):		
ASW-15	$44.95	$33.75
ASW-17	69.95	63.00
Monterey	34.95	29.00
Fournier RF4	34.95	29.00
Malibu	25.95	22.00
AIRTRONICS:		
Olympic	$49.95	$40.95
Grand Esprit	129.95	102.50
Questor	34.95	28.75
Super Questor	[redacted]	32.75
GRAUPNER:		
Cirrus	$84.95	$61.00
Cumulus	169.95	120.00
JP MODELS:		
Dart	$55.00	$47.00
Dart II	64.50	55.00
Javelin	49.50	42.00
MARK'S MODELS:		
Windward	$29.95	$22.95
Wind Free	39.95	28.95
Wind Free R.T.C.	[redacted]	77.50

OTHER R/C PRODUCTS . . . . .

In addition to all of the items listed and shown in this ad, TOWER HOBBIES carries all of the following lines: Austin Craft, DuBro, Goldberg, Robart, Rocket City, Sonic-Tronics, Su-Pr-Line, and Tatone ACCESSORIES; Ambroid, Devcon, Hobby Poxy, Southern RC, and Titebond ADHESIVES; Tower Hobbies BALSA WOOD; Eveready and Tatone BATTERIES; A-Just-O-Jig, Dremel, and X-Acto BUILDING EQUIPMENT; Perry CARBURETORS; Coverite, Royal Silk, and Southern RC COVERING MATERIALS; Kavan and Sonic-Tronics ELECTRIC STARTERS; K [redacted] FUEL; Sullivan FUEL TANKS; Fox and K [redacted] GLOW PLUGS; DuBro, Hagi, Kalt, Kavan, RC Helicopters Inc, and Graupner HELICOPTERS; Complete selection of MUFFLERS; Aero Gloss, Hobby Poxy, and K [redacted] SuperPoxy PAINTS; Badger PAINT SPRAYERS; Top Flite and Tornado PROPELLERS; EK, Kraft, MRC, and Tower Hobbies RADIOS; Goldberg, Rom Air, and Sonic Systems RETRACT SYSTEMS; Tower Hobbies RUBBER BANDS; JP SCALE INSTRUMENTS; Williams Bros. SCALE PILOTS; Midwest, Tatone, Tower Hobbies, and Williams Bros. SPINNERS; DuBro Goldberg, and Universal WHEELS.

All are in our new SUMMER '74 fully illustrated catalog - at the lowest prices, of course!

TOLL FREE

COD PHONE ORDERS

CALL TOLL FREE 800—637-6050

ILLINOIS RESIDENTS CALL COLLECT 217—356-4294

FOR IMMEDIATE COD SHIPMENT

WEEKDAYS	9:00 A.M. to 10:00 P.M.
SATURDAYS	10:00 A.M. to 5:00 P.M.
SUNDAYS	12:00 Noon to 5:00 P.M.

HOW TO ORDER BY MAIL

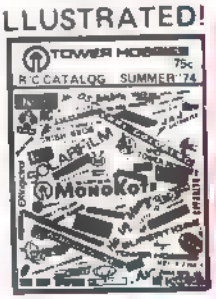
Add $1.00 to each order for Full Insurance, Postage, and Handling. Money Order or Check only (Personal checks may be delayed to allow for clearance). Foreign Orders add $10.00 (Excess will be refunded). Satisfaction always guaranteed.

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

JUST RELEASED SUMMER '74 CATALOG

The Summer '74 catalog [redacted] an updated version of the Spring '74 catalog. Over [redacted] manufacturers of kits, radios, engines, and accessories at the lowest prices anywhere! Send 75c (mailed 3rd class). For first class mailing, send $1.00. FREE WITH ANY SIZE ORDER.

FULLY ILLUSTRATED!



A Twelve-year-old Becomes National Soaring Champion / Jeff Mrlik

I got interested in RC Gliders through my dad. He built his first glider during the winter of '71-72. When spring came, I was busy with Little League baseball and only occasionally went with him, while he practiced. I wanted to learn to fly, but since my father was a novice with only one plane, I only flew a half dozen flights before the 1972 Nationals. My dad built his second plane for the '72 Nationals. It was a big one—a 14-foot original design. I went with him to the NATS. I really enjoyed the planes and the three-day contest, which was held at Miller Meadows in Chicago. Attending those Nationals really turned me on to RC gliders. After the Nationals, dad gave me his old plane, so I started practicing with him. I entered my first contest at Lancaster, Ohio, on October 8, 1972.

That winter ('72-'73) my dad and I started to plan for the 1973 Nationals. I wanted to try for a high placing in Junior, since I was impressed by the little Japanese boy who flew in the '72 Nationals. I asked dad what kind of plane I should fly, and he decided that he would build me an Astro-Jeff. It would be a rather large plane, using his balsa fuselage as a model from which to make a fiberglass mold and fuselage. He spent the whole winter building the first Astro-Jeff, making the mold, laying up the fuselage and building the plane. I painted the pilot and helped him whenever there was something I could handle. The plane was finished in time for the Toledo Conference, but he didn't win anything.

A couple weeks before the Toledo Conference, the club to which I belong (The Greater Detroit Soaring and Hiking Society) had its Annual Sno-Fli. I placed first in Junior and second over all, flying an Olympic.

(Continued on page 83)

Date	Position	Entries	Location (Junior Placement)
10/8/72	8	23	Lancaster, Ohio
10/15/72	25	33	Salem, Ohio
1/21/73	6	15	Dansville, Michigan
2/18/73	2	32	Plymouth, Michigan (first Junior)
3/4/73	7	25	Plymouth, Michigan
4/1/73	9	17	Plymouth, Michigan
6/24/73	38	57	Benton Harbor, Michigan
6/30-7/1&73	19	30	Decatur, Illinois (first Junior)
7/8/73	16	[illegible]	*York, Pennsylvania (second Junior)
7/15/73	56	76	Dansville, Michigan
7/26/73	1	132	Lockport, Illinois (first Junior)
8/18/73	2	60	Warsaw, Indiana (first Junior)
8/19/73	1	65	Warsaw, Indiana (first Junior)
8/25/73	6	[illegible]	Syracuse, New York (first Junior)
8/26/73	[illegible]	54	*Syracuse, New York (first Junior)
9/23/73	[illegible]	52	Utica, Michigan
10/6/73	42	77	*Plymouth, Michigan (fourth Junior)
10/7/73	20	72	*Plymouth, Michigan (second Junior)
11/4/73	1	15	Plymouth, Michigan (first Junior)
12/2/73	[illegible]	[illegible]	Plymouth, Michigan
1/6/74	[illegible]	21	Plymouth, Michigan (first Junior)

*ECSS Contests (placed first in Junior and 14th over all)

Photos by Jerry Mrlik

ASTRO-JEFF

Grand Champion of the 1973 SOAR NATS,
this soarer has set a standard of excellence for sailplanes.
It's rated among the top RC glider designs of all times . / by Jerry Mrlik

Photos by Author

The Astro-Jeff is the result of an attempt to design an attractive looking, large RC sailplane which would have good thermal qualities, long range, good maneuverability, and a device to aid its pilot in making successful landings. Larger sailplanes seem to be scoring better and, as the soaring sport progresses, more fliers are using the big gliders to obtain the higher levels in LSF.

A great deal of thought and effort have gone into the design of the Astro-Jeff. Primary consideration was given to strength versus weight, and every attempt was made to optimize the usual design compromises.

The biggest question was what to use for wing wires in a sailplane having close to 1400 sq. inches of wing area. Having witnessed numerous large sailplanes fold their wings on the tow, while using 125-lb. test line, I decided to design a wing system that would exceed the towline requirements. Making the necessary strength calculations, I decided on the 1/16 x 5/8" spring steel cross section. The advantages are several (greater strength with less weight): (A) The modulus of this section is the equivalent of using six pieces of 3/16" diameter music wire; (B) The weight savings are in ounces; (C) The spring steel blade, when used on edge, has the flexibility in the fore and aft direction equivalent to one piece of 3/32" diameter music wire.

I feel that item C is very important, since this flexibility reduces the chances of wing damage in a hard landing. The steel blade acts as a shock absorber. Using round diameter wires to take the towline forces means that the wing must be equally strong in all directions. The Astro-Jeff wing is designed to take the forces through the spars, then to the ply box which houses the nylon wing blade channel. This method requires no extra spars or ply ribs. The airfoil is a modified Cirrus section, flat bottomed.

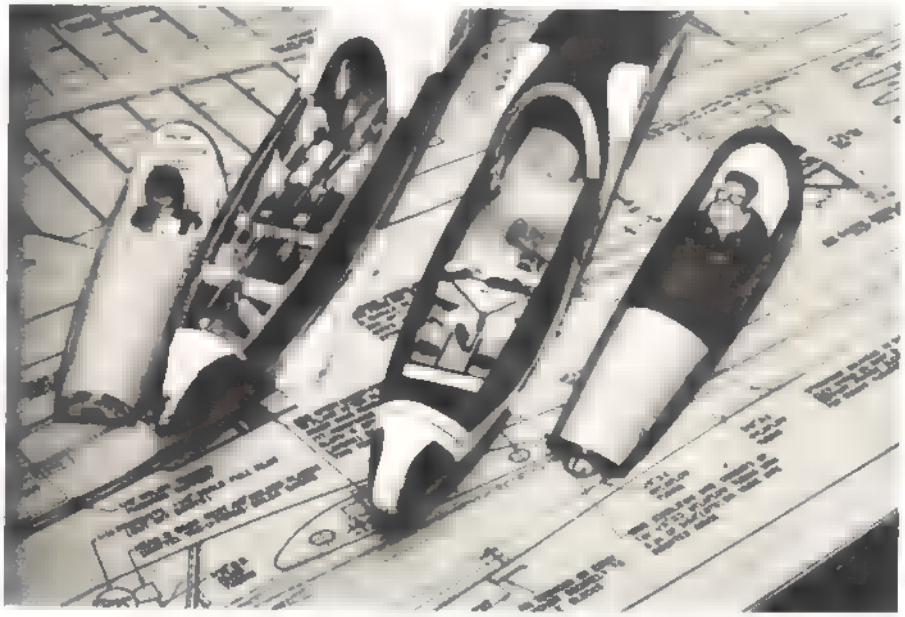
The spoiler mechanism is simple, with no worry about linkage disconnection on a hard landing. No hook-up is required when assembling the wing. The spoilers are located on the wing outboard of the wing wash on the elevator, in order to prevent stab flutter.

The rudder can easily be removed for transporting, adjusting or repairs. The canopy attachment is simple, positive and very reliable. All controls are internal, with no stress risers in the fuselage and, therefore, minimum drag. The scale pilot gives the sailplane a realistic appearance.

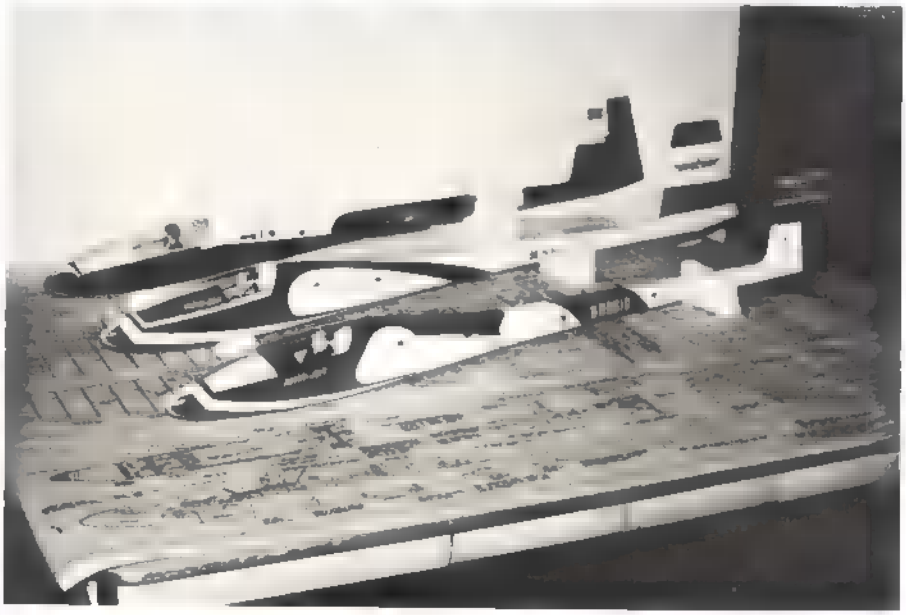
At Toledo '74, Jerry and Jeff Mrlik took a respectable third place in the Sailplane Category with the Astro-Jeff.

The Astro-Jeff is elegant in the air, floating ▬ the lightest lift, yet solid in turbulence.

The radio compartment is spacious enough for any gear. The installation ▬ the left uses a different method of spoiler actuation than the one shown on the plans. The spoiler linkage used in the Astro-Jeff ■ very simple to install and reliably accurate.



Three Astro-Jeff's on the author's workbench. Jeff's is in the foreground, Jerry's is next, and the balsa version is in the back.



The grades of balsa and plys indicated on the plans have been carefully selected, and should be followed explicitly. Carefully review the plans, and read all the notes.

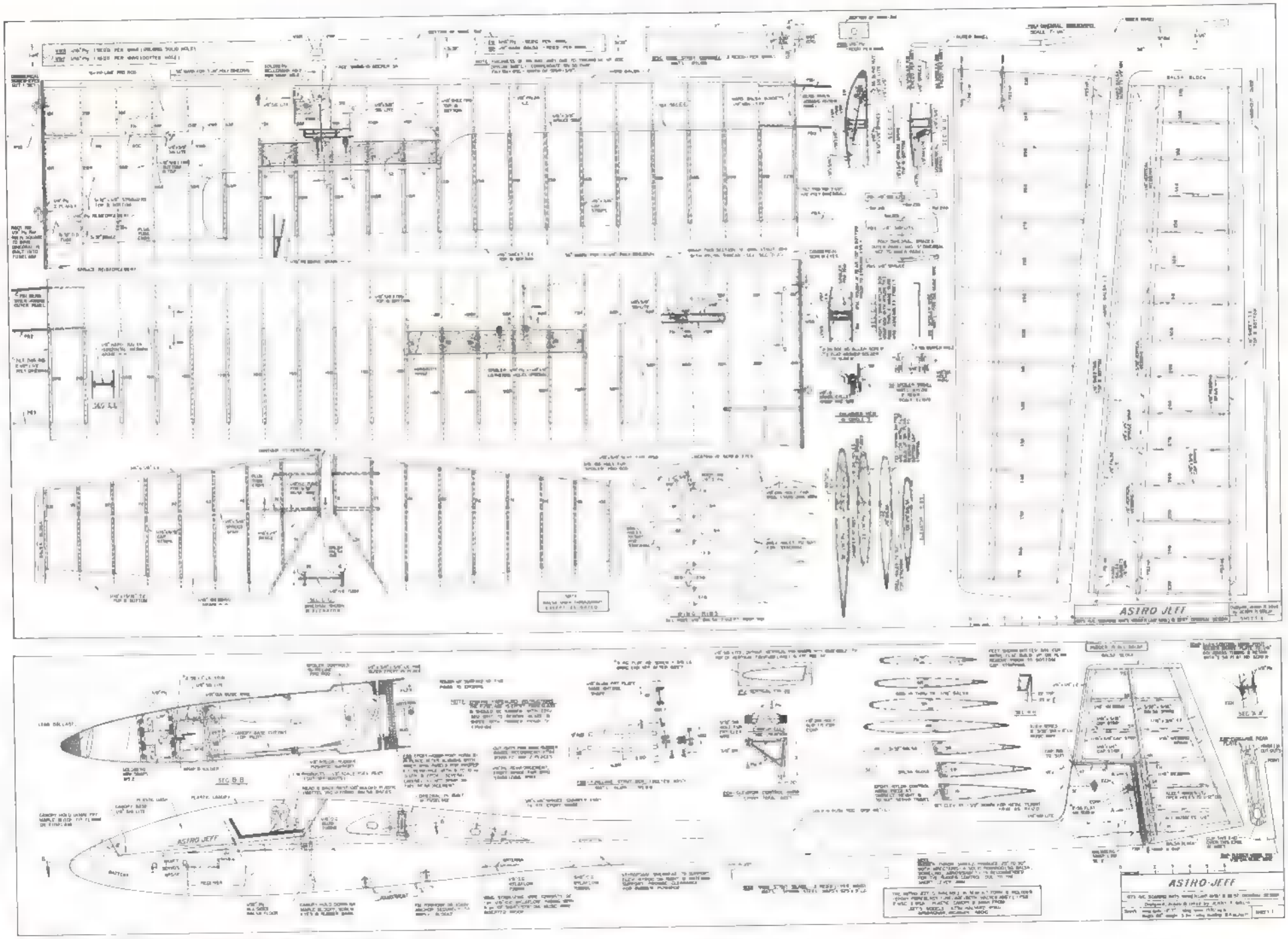
The Astro-Jeff can be built with either a balsa or epoxy fuselage. The plans for either version are available from AAM's Plan Service. (See page 86.) The Astro-Jeff is available in semi-kit form for $48.00, plus shipping (check your local UPS office for the rate under 25 lb., and exceeding 84 inches combined length and girth), from Jeff's Models, 6730 Halyard Road, Birmingham, Michigan 48010. The semi-kit includes: (A) One assembled epoxy fiberglass fuselage; (B) One plastic canopy and dash; (C) Two spring steel wing strut blades (WSB); (D) Two nylon wing strut channels (WSC) with machined groove; (E) One fuselage strut box (FSB), machine grooved and assembled.

CONSTRUCTION

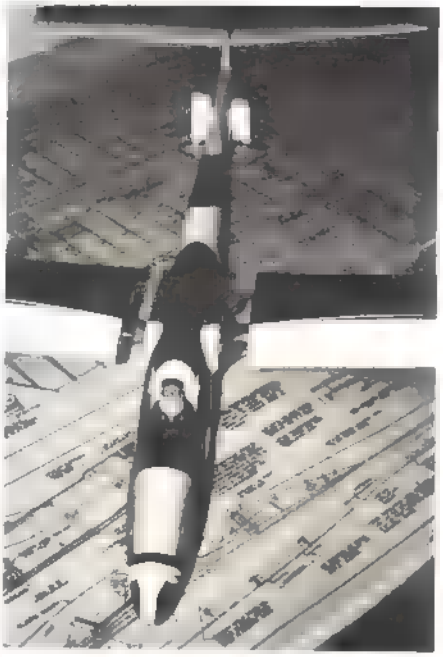
Fuselage: The epoxy fiberglass fuselage comes with both halves assembled. Sand interior areas for epoxying, per instructions on plan. Use Hobbypoxy No. 1 throughout, unless otherwise noted. Cut out the foam bulkhead, then epoxy the antenna Nylaflow tubing in the bulkhead, and provide clearance for the rudder pushrod and ■ hole for the elevator Nyrod. Epoxy the bulkhead to fuselage. Fit and epoxy the 1/4 x 1/4" spruce and 1/8" ply reinforcements. Cut out a slot for the towhook, and epoxy the maple towhook mounting blocks. Add the 1/8" Sig Lite-Ply support for the elevator Nyrod on the centerline of the fuselage. Trim the rear of the fuselage (per section H-H) and fit FRP. Epoxy the ply reinforcements, as shown in section A-A, making sure that the right side is longer than the left, and leave space for FRP. Place the VFJ jig in place, and fit 4F. Epoxy 3F, 4F and FRP in place. Drill out hinges for 1/32" hinge wire (RHP) and epoxy each in place.

After fabricating ECHP, drill a 1/8" hole for ECHP, making sure the hole is in proper alignment (check by inserting a 1/8" tube and slighting from front). Install ECHP and mark the location of the 2-56 screw. Drill and tap for same. Fabricate ECH, and slot out the front hole in the vertical fin to match ECH.

Using the plan for templates, cut out two 1/8" ply root ribs. Clamp together and drill location of the two screw eyes with a 1/16" drill. (These will be used as dowel holes and to locate the remainder of the holes to the fuselage.) Drill the other holes (1/8" and 3/16") and cut out the 1/16 x 5/8" slot for the steel wing blade. Make this a close fit, so that proper alignment can be maintained. Mark the ribs left/right and place on the fuselage. Line up the bottom front edge and transfer the two 1/16" holes. Insert pieces of 1/16" wire (dowels) to hold and locate the ribs to the fuselage. Drill the 1/8" and 3/16" holes. Drill 1/16" holes at the top and bottom of the 1/16 ■ 5/8" slot. Remove the ribs, mark the opening for FSB (use 1/16" holes for reference) and cut out. Do the other side and insert FSB through the fuse-



FULL-SIZE PLANS AVAILABLE–SEE PAGE 86



■ double wing securing system is necessary, so that ■ spoiler linkage will remain in equilibrium. Any amount ■ gap between the wing and fuse would delay spoiler actuation, thus causing ■ aileron effect in flight.

Spoilers deployed, the Astro-Jeff becomes ■ real target drone, capable of zeroing in on the landing spot.

lage. (Note: The four center round-head screws can be removed and replaced. After alignment, trim the width of FSB to fit the fuselage width.)

Place root ribs on the dowels in the fuselage and insert WSB through the ply rib and into FSB. Support the fuselage by placing blocks under WSB (both sides), and check alignment of the fuselage from the front to be sure that the fin is vertical. Tack-glue FSB to the fuselage with epoxy. Do not epoxy the ply ribs to the fuselage. When dry, remove blades, dowels and ribs.

Drill a 3/16" hole in the 1/2 x 3/4 x 5/8" pine block and locate it to the fuselage (use 3/16" tubing to check squareness). Tack-glue in place with epoxy. When dry, epoxy the pine block and FSB, using fiberglass cloth, as shown ■ plan. If eight- or ten-oz. cloth is not available, use several layers of lighter cloth to obtain the equivalent. Do not skimp on this reinforcement—use plenty of Hobbypoxy No. 2. Remember to rough up surface of FSB to insure good adhesion of epoxy.

Cut out the slots for the wing rubber bands, add the spoiler Pro-rods, and canopy hold-down block. Complete the radio installations at this time. The Kraft installation is shown and can be used as a guide. There is lots of room left, even for a thermal sniffer.

Rudder: Cut out the ribs, using templates. Pin ribs to plan, glue ■ the top spar, LE, top TE and cap strips. When all glue joints ■ set, remove from plan and cut off the tabs from the ribs. Glue in the bottom spar, TE webbing and spar webbing. Sand a bevel on the rear TE and glue in place. Next, glue in the gussets and cap strips. Sand the end faces and add balsa blocks. Shape blocks per plan. Locate hinge positions and epoxy in place. Drill the hinges and block, and secure by epoxying in toothpicks. Epoxy the balsa fillers and control horn. Assemble rudder, using RHP, and determine cap rib thickness between the fuselage and rudder. Remove the rudder, add the cap strips and sand completely.

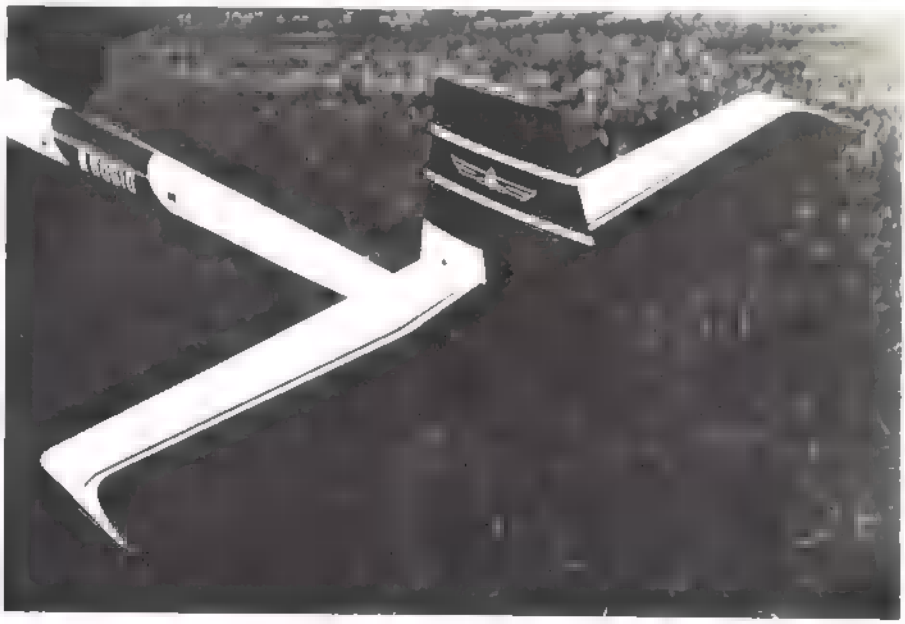
Elevator: Cut out the two aluminum templates 4E and 10E. Stack 14 pieces of balsa, clamp together with screws, and shape ribs. Use the plan templates to cut out ply ribs 1, 2, and 3 (make two of each). Stack pairs of ribs and drill 1/8" holes for the brass tubes, making sure that this dimension is the same as ECH. Make sure that there are tabs on all ribs for building purposes. Pin the spruce spar to the plan and glue all ribs. (Don't forget to tilt the root rib for dihedral.) Glue TE, LE, top spar and cap strips. When dry, remove from plan and remove tabs from the ribs. Glue the TE and TE webbing, after sanding bevel on the 1/16 x 3/16" TE and cap strips. Plug the tube ends and epoxy in place. Glue on balsa ribs and balsa tip blocks. Contour the balsa rib to the vertical fin and sand completely.

Center Wing Section: Make aluminum templates for all balsa wing ribs (seven templates required). Cut balsa for stacking, with appropriate template ribs 1BF through 11BF, 1BR through 11BR, 12B through 22B, and 23B through 37B. (Note: 22B and 23B are identical templates, except for spar width, so cut accordingly.) Assemble stacks, drill holes and bolt together with long screws, or fabricate screws using bicycle spokes. Both right and left ribs can be cut together. If both right and left ribs are cut together, mark alternate ribs R and L when disassembling stack to maintain a consistent taper. Add 3/16" holes to ribs 1BF through 8BF for spoiler Pro-rod (5/16" from bottom of rib, other dimensions on plan).

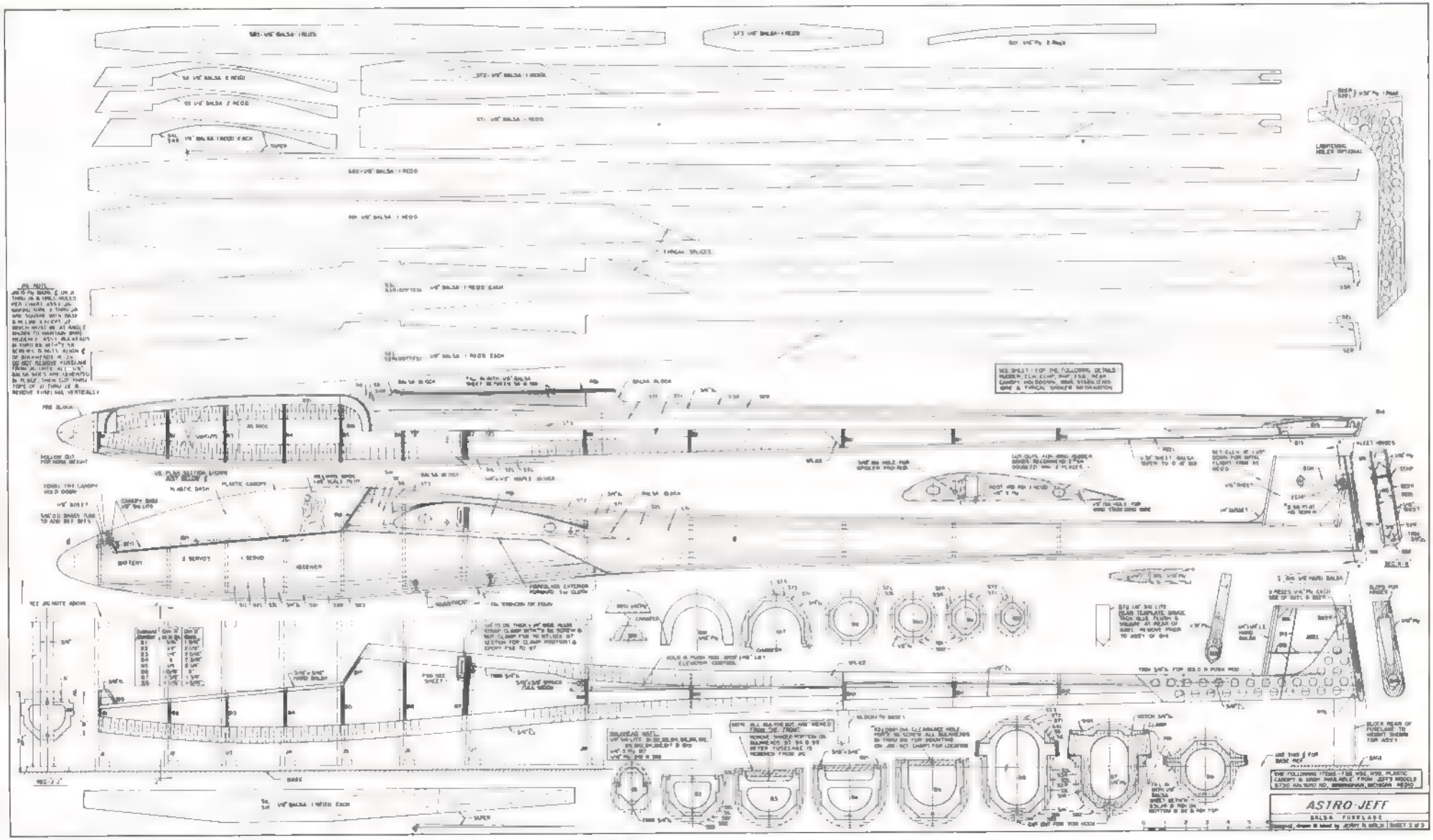
Fabricate the spar box as follows: Glue VWR to top and bottom spars. (Glue VWM and five pieces of 1/8 ■ 3/8" Sig Lite-Ply braces, fitted to length. Determine thickness of RN by stacking FN and WSC. The total thickness of these, when subtracted from the 3/8" spar, is the thickness of RN (nylon sheet has a .03 tolerance, and this variation is made up with RN).

Rough up the top, bottom and rear of WSC (nylon) for better adhesion. Epoxy RN to VWR (between spars), and WSC to RN (Hobbypoxy 1 or 2). Coat WSB (steel blade) with light oil, or silicone film, and place in WSC (oil film will prevent epoxying WSB in place). Epoxy FN to WSC and spars. Glue or epoxy VWF to FN and spars. Place this assembly in position on sheeting, with root rib in place to insure proper alignment, and clamp the entire assembly (do not glue root rib to sheeting). Slide WSB to insure slip fit. Make sure VWR/VWF match spars, and check ribs 1BF through 11BF for correct height

The tailfeathers of this bird are well-proportioned. That large rudder ■ for solid response.



(Continued on page 78)



FULL-SIZE PLANS AVAILABLE—SEE PAGE 86

How to Fly a Model

Actually, a brief exegesis on transporting a model via the airlines /by Don Gutridge

Whether you are preparing to fly to Lake Charles for the Nationals, or thinking of taking your model along on that vacation to Hawaii, you will want to ensure that your model arrives with you, and in one piece. Due to the length and complexity of Federal Regulations governing commercial aviation, this article will serve merely as an outline for general procedures.

Care to buy an extra seat at half price? You can do it, if you like, and strap your creation into the seat beside you. While most of us will forgo such luxury, we have all invested a great deal of time and money in the models we fly, and nothing but the best protection will ever do them justice.

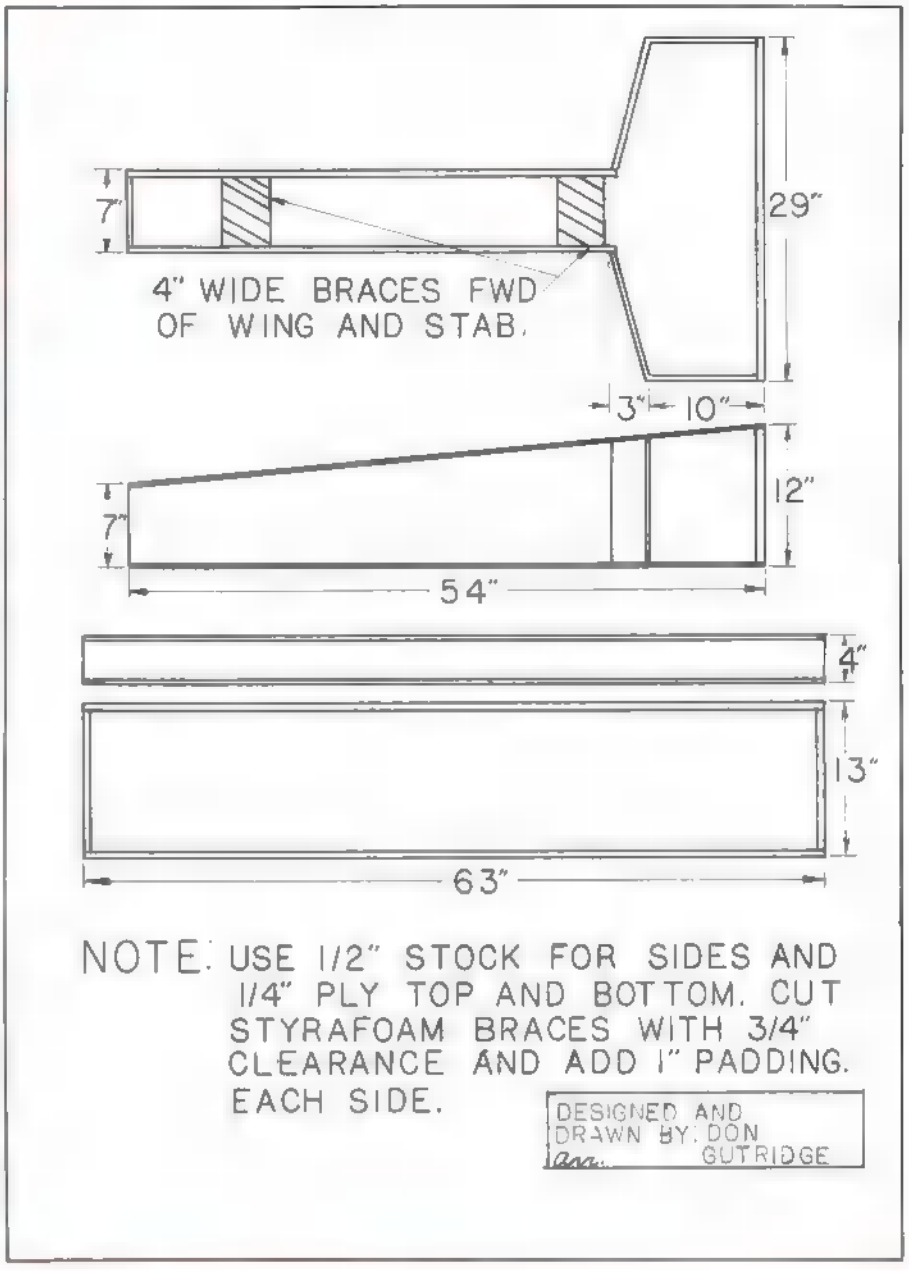
Just what is the best protection available? Judging from what I've seen arriving at many contest sites, most people seem to perfer a coffin-like configuration. Larry Leonard used to have a box that put the local coffin-maker to shame, and only took three men and a boy to carry. While this type of container is great tied to a camper or car, it is seldom compatible with the cargo area on an airliner. What is the answer?

The packing cases illustrated here offer the following benefits: (1) One small boy can carry them. (2) Cost is only $25.00 total. (3) Construction time is only two evenings. (4) Extra room for fuel-transmitter and/or accessories. (5) Most models will qualify as "excess baggage" when packed this way, thereby reducing cost for shipment. (6) Most importantly, these boxes offer maximum protection with minimum effort.

United Air Lines offers five different methods of shipping models, all of which include our *extra care* handling procedures. Each method is listed below, with a condensed checklist for you to follow. While fuel cannot be carried into the cabin of an aircraft under any circumstances, it can be shipped in the cargo area, but only if it is *properly* packaged. A post card addressed: United Airlines E$P, Don Gutridge LAXRR, 1001 Wilshire Blvd., Los Angeles, Calif. 90017, will get you a summary of fuel packaging and all pertinent model shipping information.

Whether you are traveling with a model or not, there are special procedures you may take to ensure receipt

(Continued on page 88)



MODEL TRAVEL CHECKLIST

EXCESS BAGGAGE

Application: Boxes under 80" girth (length + width + height); maximum weight, 70 lb. ea.

1. Make seat reservations through United E$P Desk.
2. Request car at destination (if needed).
3. Build boxes and add labels.
4. Pack model-fuel-flight box.
5. Ask United agent at baggage check in area for special handling tags, and request top loading.

PRAF (Passenger Reserved Air Freight)

Application: Boxes over 80" girth; max weight, 100 lb. ea. Space to be reserved in advance with seat.

1. Make seat and model space reservations through United's E$P Desk.
2. Request car or truck at destination (if desired).
3. Build boxes and add labels.
4. Pack model-fuel-flight box.
5. Ask United agent at baggage check in area for special handling tags, and request top loading.

RAF (Reserved Air Freight)

Application: Bulky air cargo space reserved by specific flight and date.

1. Reserve space for boxes through air freight E$P Desk.
2. Request pick-up and delivery service to and from air freight facility if desired.
3. Build boxes and add labels.
4. Pack boxes.
5. Deliver boxes to Air Freight terminal and request special handling and top loading.

SPD (Small Package Dispatch)

Application: Boxes under 90" girth and under 50 lb. ea. Airport to airport service to/from any United city.

1. Build boxes and add labels.
2. Pack models.
3. Deliver to baggage check in area at least 30 min. before flight departure.
4. Pick up at destination city 30 min. after flight arrival.

HALF PRICE MODEL SEAT

Application: The ultimate in extra care for your model.

1. Reserve seat for yourself and your model through United's E$P Desk.
2. Rap model with protective covering.
3. Carry model on board and secure into the extra seat.

"SHARK"

SPECIFICATIONS SHARK

OVER ALL DIMENSIONS
LENGTH 53" . . . WIDTH OF MACHINE AT SKIDS 14" . . . WIDTH OF PASSENGER COMPARTMENT 6" . . . HEIGHT 22½".

[redacted] PARTS
2-PIECE PLASTIC BODY . . . CLEAR PLASTIC WINDOWS AND WINDSHIELD . . . MANY STEEL, ALUMINUM AND BRASS COMPONENTS ALL CAREFULLY MACHINED [redacted] PRE-FORMED, [redacted] TO BOLT TOGETHER.

ENGINE
O & R 1.34 CUBIC INCH DISPLACEMENT . . . CUSTOMIZED FOR GLO FUEL BY DU-BRO PRODUCTS . . . SPECIAL R/C CARBURETOR DESIGNED AND MANUFACTURED BY DU-BRO PRODUCTS . . . USES REGULAR R/C GLO PLUGS . . . PULL STARTER BUILT [redacted] . . . GEAR BOX [redacted] CLUTCH [redacted] ALL ONE UNIT, READY TO BOLT IN PLACE.

[redacted] [redacted] (SHAPED)
[redacted] WOOD . . . SPAN 52¼" . . . CHORD 2" . . . AIRFOIL, HIGH LIFT SECTION . . . HILLER TYPE SEMI-RIGID ROTOR.

TAIL [redacted] (SHAPED)
BASS WOOD . . . DIAMETER 11½" . . . CHORD 1¾"

FLY BAR
STEEL ROD . . . SPAN 28½" FLY [redacted] WEIGHTS, EXTRUDED ALUMINUM, AIR FOIL SECTION.

WEIGHT
FLYING WEIGHT WITH FULL TANK APPROX. 14 POUNDS . . . ADDITIONAL PAY LOAD APPROX. FIVE POUNDS.

PERFORMANCE [redacted]
TOP SPEED FORWARD ESTIMATED AT 70 MPH . . . PROPERLY TRIMMED, WILL FLY HANDS OFF . . . ALTITUDE, OUT OF SIGHT . . . CLIMBING STALLED TURNS . . . STEADY HOVERING . . . EXCELLENT CONTROL ON VERTICAL RISE OR DESCENT 360° TURNS HOVERING OVER ONE SPOT . . . FLIES FOREWARD, BACKWARD OR SIDEWAYS . . . HAS [redacted] FLOWN WELL IN [redacted] MPH WIND GUSTS.

ALL ALUMINUM BOLT TOGETHER CONSTRUCTION

THE QUICKEST AND EASIEST CONSTRUCTION OF ANY HELICOPTER KIT

only $350.00 Cat. No. [redacted]

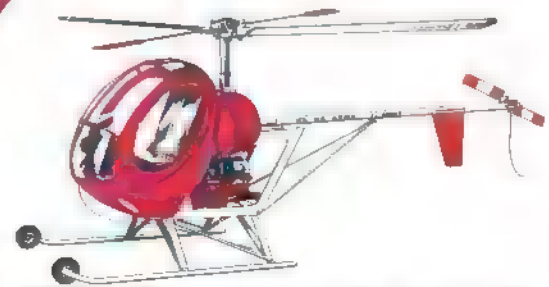
CAN YOU PICTURE A RADIO CONTROLLED FOURTEEN POUND FLYING HELICOPTER MODEL THAT DIVES, ZOOMS, DOES STALL TURNS, VERTICAL BANKS, SNAP TAIL TURNS, FLIES FORWARDS OR BACKWARDS, [redacted] SIDE TO SIDE, CAN RISE AND HOVER OVER ONE SPOT? AN AIRCRAFT POSSESSING SO MANY REFINED [redacted] FEATURES IT'S A PLEASURE JUST TO LOOK AT IT.

ADVANCED R/C MODELERS AND FLYERS CAN NOW OWN SUCH AN OUTSTANDING AIRCRAFT . . . "THE DU-BRO SHARK" HAS ALL OF THESE FINE PERFORMANCE FEATURES PLUS DESIGN AND MANUFACTURING QUALITIES THAT ARE THE ULTIMATE IN THE ART AS IT STANDS TODAY . . . THIS BEAUTIFUL MACHINE IS A "BOLT TOGETHER" ASSEMBLY WHICH, OF COURSE, MEANS MAINTENANCE, REPAIRS OR PARTS REPLACEMENT CAN BE ACCOMPLISHED WITH EASE . . . AN OVERSIZED UNDER CARRIAGE AND "LANDING SKID ASSEMBLY KIT" IS ALSO AVAILABLE FOR TRAINING R/C PILOTS JUST GETTING INTO THE CHALLENGING AND FASCINATING SPORT OF R/C MODEL HELICOPTER FLYING.

FINE MODEL PRODUCTS BY DU-BRO

"HUGHES 300"

SEMI-SCALE, RADIO CONTROLLED MODEL HELICOPTER KIT COMPLETE WITH O&R 1.34 CU. IN. GLO FUEL ENGINE, GEAR BOX, INERTIA CLUTCH AND AN ALL BOLT TOGETHER CONSTRUCTION. SIMILAR IN MANY WAYS TO THE DU-BRO "SHARK", THE "HUGHES 300" IS ANOTHER BEAUTIFUL, HI-PERFORMANCE



AIRCRAFT. PROPERLY TRIMMED, WILL FLY HANDS OFF. TRULY A REMARKABLE AND FASCINATING NEW CHALLENGE IN THE FIELD OF RADIO CONTROL. $350

designed and manufactured by

DU-BRO PRODUCTS INCORPORATED
wauconda, illinois 60084 u.s.a.

*RADIO EQUIPMENT . . . EPOXY . . . FUEL TANK . . . GLO PLUG . . . 225T WHEELS AND DECORATING MATERIALS NOT INCLUDED WITH KIT

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

MAIL ORDERS F.O.B. FACTORY

PACER

Everyone knows about little 049-powered RC models. They are twitchy, fragile, buzzy things that dart around in a state of semi-controlled agitation while cluttering up the sky. They get in the way of the serious fliers with their serious planes. They are OK for the kids, but a grown man who wants to experience what RC is really all about with a really groovy responsive ship has to have a six-foot, six-pound, 60-powered job, complete with at least six channels. Right?. . .WRONG!

Today's state of the art has changed all this, and a new breed of clean responsive craft is on the way. They not only look like, but *fly* like, their big competitive brothers; and at the same time offer some very considerable bonuses. In an age of growing shortages of energy, you can now have five and ten minute flights on one or two ounces of fuel. Long weekend trips to the field can be supplemented by ■ walk to a nearby playground, as all you need for an hour's session can easily be carried in two hands.

A few 60 pilots have been impressed enough to state their belief that this could be a great way to sharpen their competitive skills, and cut down on those 30 gallon summers. A study of the plans will indicate ease of assembly, with a minimum investment of time and money.

The Pacer may well turn out to be the father of this whole new family of RC craft. The concept is an audacious one, made possible by a combination of three essential elements: the availability of high-quality miniaturized RC gear, an engine capable of delivering an immense amount of power per ounce, and imagination. The three ingredients are not new; this particular combination is.

DESIGN PHILOSOPHY

It is not generally understood that an airplane, large or small, is first of all an *idea*. Sometimes vague in the beginning, the idea is filtered through past experience, practical considerations of available materials and methods, a clarification of goals, and a measure of intuition. When successful, the result is a collection of parts moving together as one to form a new entity—which sometimes, though rarely, equals or exceeds the hopes of its creator.

In terms of experience, the last dozen years have witnessed the birth of over sixty original RC designs by the author. There have been successes and failures, and the latter have been the teachers. Risk is always the constant companion and, from this, we learn to enjoy the trip—regardless of the outcome. Nothing is ever wasted, for the failures are seen ■ a necessary part of learning to bracket the errors.

Always there are the decisions, and each usually represents a trade-off—but not always. A designer often feels he must choose between aesthetics and performance which, in turn, results in either an easy-to-build "Ugly Box" or a highly complex "Slick Brick." This assumption that it has gotta be *this* or *that* is false, for the underlying premise of all good design is simply that "Form must follow function." Neither ugliness nor complexity ever made a model fly better. If either type worked well, it was not because of, but in spite of, these limitations. The current practice in model aircraft design is often so simple that anyone can become an expert overnight by following one basic rule: "If it don't fly too good, stick on a bigger engine."

It is almost incredible how successful this method is, and surely helps explain the popularity of using larger and larger engines on increasingly smaller airplanes. Effective as the method might be, it does not really present much of a design challenge. The Pacer is the result of a challenge, a desire to see how much performance could be coaxed forth, while working within the confines of an RC payload, on one hand, and the available power of the Cox Tee Dee 049-051 on the other.

The goal was not to achieve a VTO trip to Mars, but rather to find a harmonious relationship of parts which would result in the superior flight characteristics usually associated with larger, high-powered pattern planes.

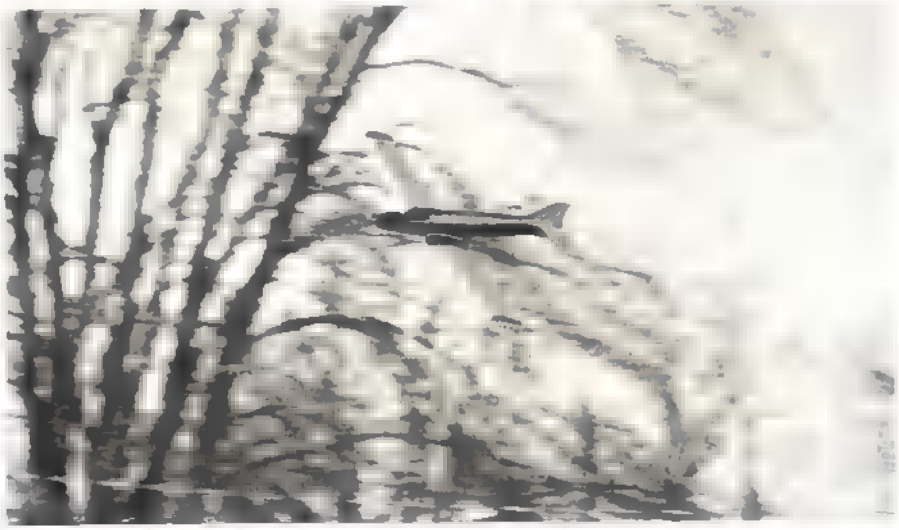
HISTORY

While not a committee, several modelers were involved in the development of the concept.

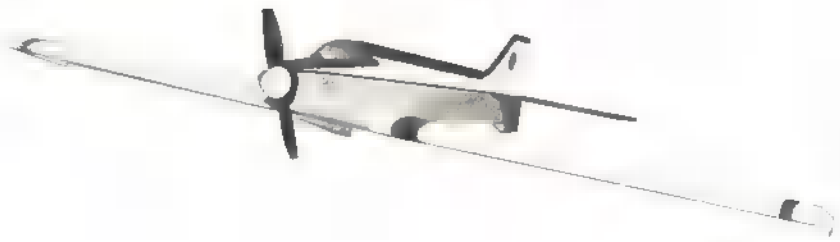
The plane that triggered the action was a P-51 Ace Warbird fitted with rudder, elevator, strip ailerons and ■ hot Cox 051. Tom Runge had brought it to Madison on a visit in the Summer of '73. His flight demonstrations included low inverted passes, and most everything else in the book. None of us had ever seen ■ ½A ship perform so outstandingly, which was a credit to both pilot and plane. Riding home from the field, a discussion among Tom, Frank Baker and myself explored the idea of taking another look at small, high-performance models, which would begin where the Whizard and Warbird left off. We agreed that it was well within the realm of the possible and, if successful, might be just the thing to make the small RC plane respectable. Work started the following day.

While Frank proceeded with ■ highly modified Whizard—a cabinless mid-wing, I was approaching the problem from another angle. Under Tom's watchful eye, a new design began to take shape. All of the inherent stability of the Whizard was designed *out*, to achieve the desired neutral stability of ■ pattern ship. Moments were lengthened, to smooth out elevator response, and every part made as clean as possible. Following Romey Bukolt's Warbird lead, the retractable landing gear problem was solved in the simplest possible manner—elimination. (An old artists' adage advises: when in doubt—leave it out!) In a spirit of fun, it was called the Mach None. Two prototypes were cut before Tom left for the NATS and home.

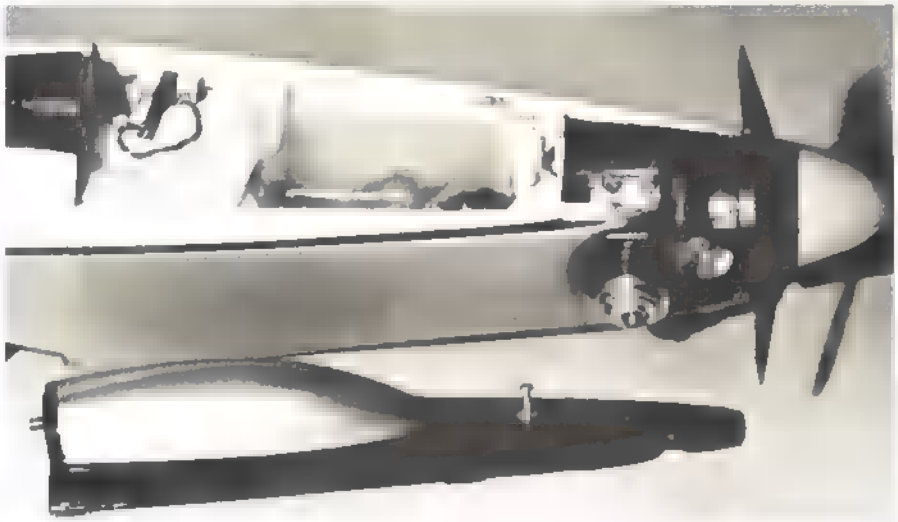
First flights of all three planes took place about the same time, with Frank and I in Madison and Tom in Omaha.

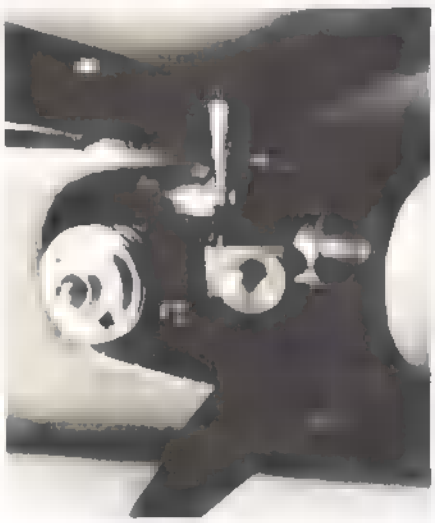


In the air, the Pacer shows the classical lines of its sleek pattern lineage.

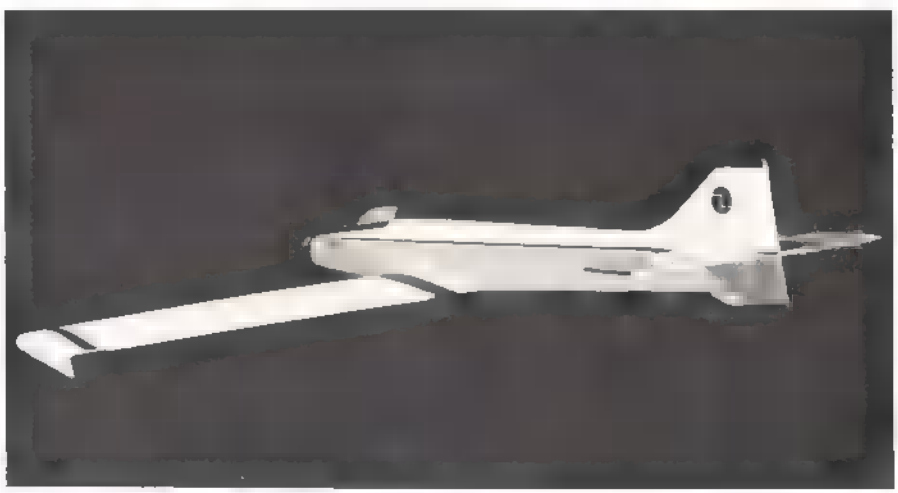


Here's a design that can be honestly touted as a miniaturized version of ■ 60-powered competition ship. Earlier versions of the model were flown by AAM's editorial staff—it's the real thing.





ABOVE: The one-piece hatch is removed to show the Sullivan two-oz. tank installation. Airborne batteries are located, in foam, just aft of the tank. RIGHT: The Kirn-Kraft needle valve ensures peak setting for the Cox Tee Dee 049. Maximum performance, as with the 60-sized jobs, requires ■ screaming engine. BELOW: The sub-rudder is an aerodynamic necessity, but it also serves as ■ landing skid. The same holds true for the raked-down wing tips, which ■■ the author's trademark.



All tests exceeded anything we could have hoped for, with absolutely no resemblance to any previous experience with planes of this size and power. Elimination of the leading gear reduced weight and drag to a point where performance took a giant step: Large, open looping maneuvers were possible. Aileron response was crisp and precise, granting true axial control—but not at first. With airspeeds in the 60-70 mph range, response was so quick that the first flights were all over the sky, and two rolls resulted when one was intended. Some of the squarest loops yet seen at our field were caused by the mere twitch of ■ thumb. This problem was solved by simply reducing control surface throws.

When the engine quit, the clean machines kept right on going, and none of us could hit the field with our first five landings. It was rather incredible to come across the fence at less than ten feet of altitude, and watch the damn things sail clear across the field into the brush. In time, we learned to kill off speed with a combination of dead stick loops, rolls and ■ nose high attitude. Here, the low speed stall characteristics of the Ace foam wing, in combination with light wing loadings, allowed "wheels up" touchdowns at ridiculously low speeds.

Several of the more experienced pattern fliers couldn't believe their eyes, and were soon standing in line to try their hands. They quickly discovered that the major difference in technique was dictated by the visual limitations of ■ small high-speed model. *The solution was to fly close in and lower than usual to maintain visual orientation.* Strong simple color contrasts played an equally vital role in this matter.

Mention should be made that only two servos were used, for while the Whizard had been previously tested on four channels, motor control was not really necessary and the rudder was rarely used. So, ■ decision was made to go with two. The Mach None suffered a loss of spins and snap maneuvers on its two controls, but the increased performance of the lighter wing loading made it a desirable trade.

On the other hand, Frank went to a coupled aileron-rudder arrangement, which gave him the whole stunt menu with almost no weight penalty. Dealer's choice. Seeking even more, his next move was to build an 049-size Warlord (AAM Oct. 1973). Sleek and fast, the only problem was a flutter of the flying stab, which was resolved by going to a Nyrod linkage.

Meanwhile, back at the drawing board, my new one was coming into focus ■■ ■ direct result of Tom's urging. Goal: a simpler, stronger construction involving less building time; elimination of rubber band wing hold-downs, and an even cleaner collection of parts designed to stretch performance closer to the ultimate. As some of you alert ones may have guessed, it was called the Pacer. It was built in one week and displayed at Toledo, along with Tom's new Mach None. The reviews were raves, although a few die-hards doubted the perform-

ance claims. Now it's up to you to convince the doubters in your group. One flying session should do it.

ENGINES ■ RC

For over a decade, the Cox Tee Dee 049 and 051 engines have set the standard of world excellence. They have no competition, for no other manufacturer has been able to top the jewel-like perfection of these tiny power sources—machined to six millionths of an inch tolerances on highly automated equipment.

Every free flight and UC speed competitor has known this for years, but the RC flier, with his increasing obsession for larger, more expensive and complex power plants, seems to be the last to know. Now a word of caution, for those of you who believe that "more is always better," and are already making plans to put a 10 or 15 engine in the Pacer to "improve" its performance: Don't! First, fly it as designed and discover for yourself what this package can do. Then if you insist on "moving up"—be prepared for a disappointment. Romey Bukolt has done it with similar types of planes, and reports that the Max 10 produces little improvement, while increasing all-up weight considerably. A Max 15 has also been flown and, at this point, all resemblance to "flying" ends and "rocketry" begins. Here, the carefully considered collection of parts is destroyed and you are on your own.

All flight tests were conducted using the Ace Digital Commander and two Bantam servos. Performance was flawless, and weight kept to a minimum. The advantage of this system is the ability to adapt the flight package to any transmitter, thus eliminating duplication. The elevator servo was mounted to the fuselage with tape. Aileron hookup prohibits the use of Bricks. In any event, avoid the use of the larger RC systems, as a light wing loading (less than 14 ounces per square foot) is critical to optimum performance.

Author's Note: A prolonged winter in Wisconsin made it advisable to ship the plane to the warmer climate of Missouri for first flight tests.

FLIGHT TEST REPORT
TOM RUNGE

FLIGHT DATA

Weight—22 oz. w/450 mah batteries
CG—2¼" from LE
Elevator Throw—3/8" Total (±3/16")
Aileron Throw—3/16" Total (±3/32")
Engine—Cox Tee Dee 049 w/ Kirn-Kraft Needle Assembly
Tank—2 oz. (Sullivan SS3)
Radio—Ace Digital Commander w/2 Bantam Servos
Functions—Ailerons ■ Elevator

FLIGHT CHARACTERISTICS

Air Speed—60-70 mph

Trim—With wing/stab/thrust at 0°, and CG at 2¼" plane flies straight and level with all surfaces in neutral. Inverted flight requires only slight amount of down trim to maintain level flight.

Turning—Quick, linear response from neutral. Makes groovy, sweeping elevator turns, characteristic of ■ low-wing, performance airplane design. No tendency to fall off in steep bank turns.

Roll—Performs sustained axial rolls, with a minimum of down elevator in inverted position. Roll rate is fast enough to do three rolls in less than 100 yards.

MANEUVERS

Inside ■ Outside Loops—has enough power to do nice big graceful loops.

Vertical Roll—OK.

Horizontal, Cuban and Reverse Cuban Eights—no problem!

Double Immelmans—great!

Top Hat—without a throttle, gets awfully fast on the downhill leg, but will do.

Spins, Snap Rolls, Four-Point Rolls—rudder ■ necessary.

ADDITIONAL COMMENTS

The pilot is not competant beyond this point, but plane is capable of more. The plane glides amazingly long and flat. Even though I was expecting it, I still overshot the runway on the first flights. Ailerons remain effective up to stall speed, which is very slow (less than 15 mph).

CONSTRUCTION

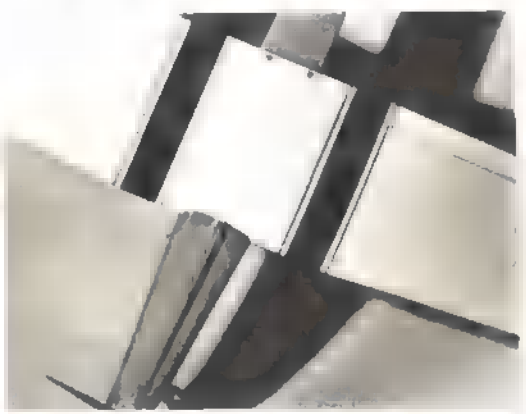
The following will be kept to a minimum, for several reasons. (1) This is *not* a beginners' model, and should not be attempted by those with little experience. (2) The plans are quite complete and reasonably self-explanatory. (3) The author has an aversion to reading (and writing) one more tedious piece on how to glue stick A to stick B. Construction is as simple and direct as possible, which results in ■ absolute minimum of building time.

Wing: Three sections of Ace foam wings, two tapered and one 5¾" straight piece, are available from Ace RC. These are cut as shown on the plans, to achieve a raked leading edge. The trailing edge stock should be 3/4 x 1/4", to fit the airfoil contour. Five-minute epoxy works fine for all foam to foam joints. The glass strapping tape is essential for wing stiffness, and can be carried over the top if inverted maneuvers are your specialty. Wing covering is a must, and here Solarfilm fills the bill best, with its combination of light weight and low heat requirements which prevent foam melting. A wide variety of colors are available, but light, bright ones are best for visibility. Avoid gaps between wing and ailerons; Solarfilm hinges were used on the original.

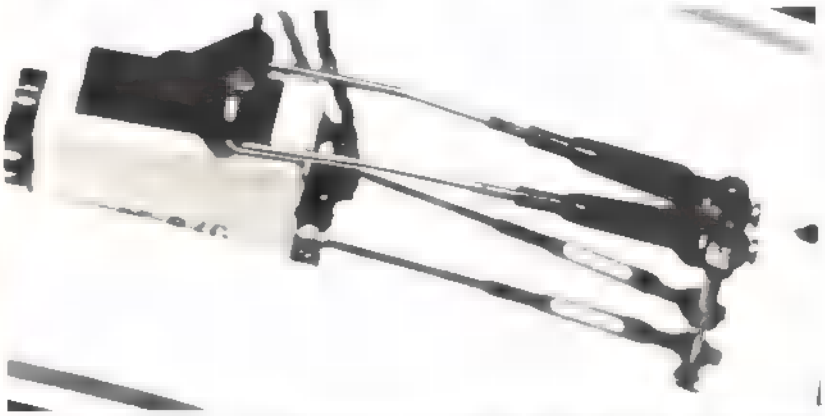
The Hoerner-type wing tips are a little extra work, but they definitely contribute to low-speed stall characteristics and certainly improve tracking. *Note:* Foam wings vary slightly, so make sure that the wing is mounted with 0° incidence. Measure center of LE to center of TE, and line up with the stabilizer.

Fuselage: Basically this is a round-shouldered box and, once all doublers

(Continued on page 81)

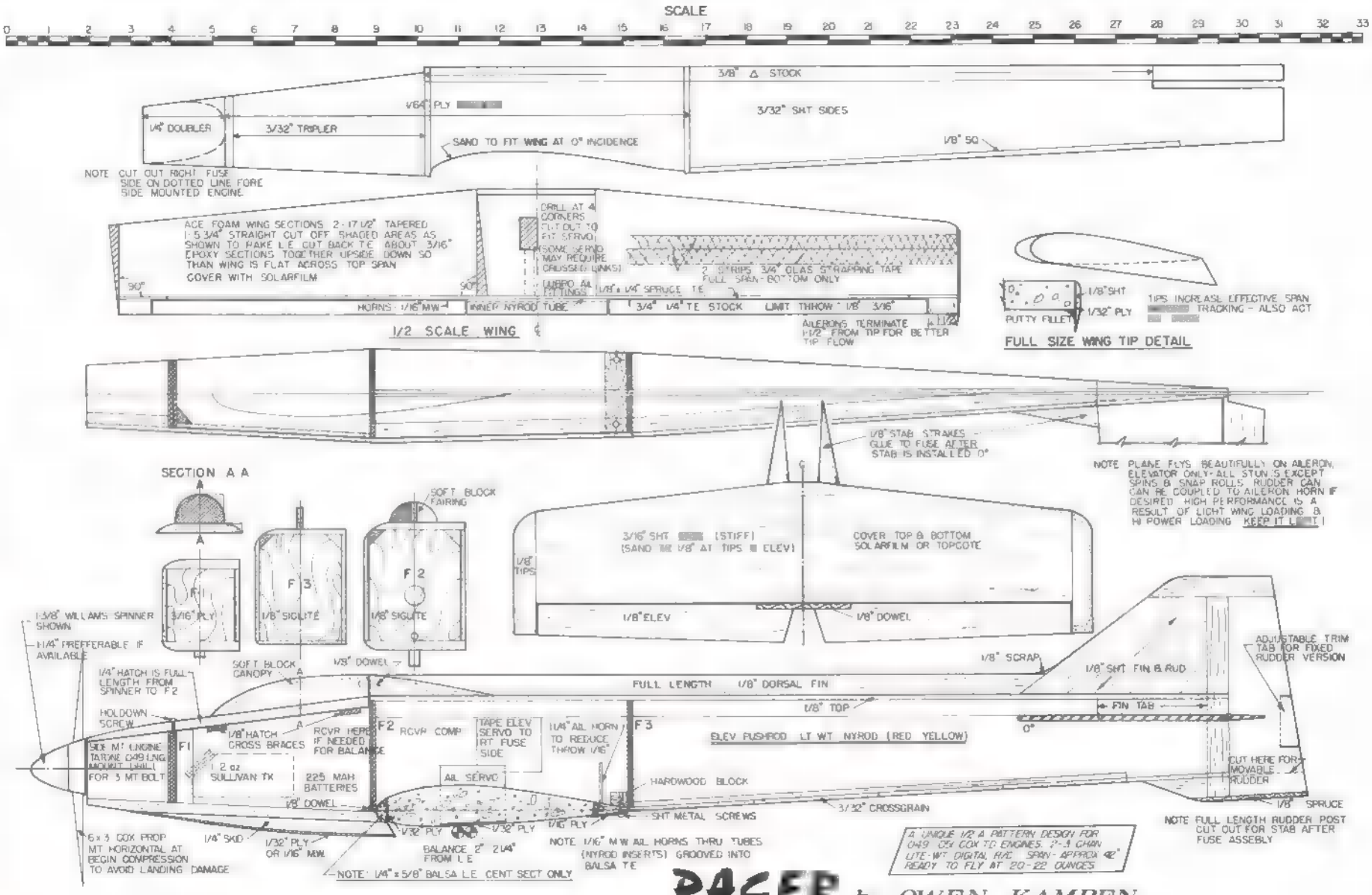


Notice anything different here? The lazy man's retract system isn't: "Let it all hang out." Rather: "Leave 'em altogether off."



Aileron linkage is per usual pattern ship installation. Note that the servo is a friction and tape fit. A piece of 3/32" O.D. brass tube is slipped over the 1/16" wire horns to accommodate the horn attachments.

FULL-SIZE PLANS AVAILABLE—SEE PAGE 86



30 August 1974

PACER

DESIGNED BY OWEN KAMPEN

Ace R/C proudly announces the PACER, a totally new concept in R/C model aircraft. It is a high performance 1/2A powered plane designed to have the fast speed, solid tracking, smooth maneuvering, and axial roll characteristics of modern pattern ships in a small, compact, economical package based on a Cox Tee Dee .049 or .051 and a two-channel radio with miniature servos and a small battery pack.

This airplane offers more excitement and ability-to-perform than ever before in its size class. All of the advantages of small airplanes are maintained: it builds fast, it is economical on fuel, it transports easily, it can be flown in the smallest of fields with no need for a runway. With all of these advantages, it still has the outstanding performance to challenge the best of fliers.

All parts are band sawed and precision sanded with foam wing.

(Ace has a 1 3/8" spinner available for this plane: 37L78–$1.25.)

13L107–Pacer Kit $19.95

SPECIFICATIONS

Span–40"
Length–30"
Weight–Approx. 22 oz. all up

Engine–Cox Tee Dee .049 or .051
Functions–Ailerons/elevator or coupled ailerons-rudder/elevator

ACE R/C, INC. HIGGINSVILLE, MO. 64037

Dear Paul,
I would like to order the PACER kit from you direct. Enclosed is my check for $19.95.

NAME _____

ADDRESS _____

CITY _____ STATE _____

ZIP _____

ACE R/C INC.

Fok.D.VIII

Had the war been prolonged, this brainchild of Tony Fokker would have superceded the famed D. VII.

by Patricia T. Groves

On October 24, 1918, a lone Salmson reconnoitered above ■ gutted and reeking landscape.

Beneath its wings, the Allied Front was slicing a jagged gash across Europe. The Siegfried Line had been broached, and Germany's Empire was collapsing.

A carefully worded request for an armistice had already been tendered, and whispers buzzed around rumor-charged world capitals. As the diplomatic cables hummed cryptic messages to political leaders, other ciphers filtered through military code rooms enroute to high-ranking in-baskets: von Hindenburg and Ludendorff were stalling—trying to buy time. And time was running out.

But what was that to a soldier burrowing in the scourged earth? There'd been truces before—a day here, a day there. Yesterday, today and tomorrow, the War was right there, right in front of him.

Or droning overhead.

In the plane above, eyes burned with fatigue, and engine fumes suddenly narrowed at the sight of a thick, straight wing bearing down out of the autumn sun. Not the biplane. No, not this time. This time, something different.

Within moments, bullets from twin synchronized 7.92s traced the dying days of War. If the German Army was going down, the Fokker D. VIII was going down swinging.

Until events forced it, progress in military aeronautics had been ho-hum. For the most part, it was up to the pilots and aircraft manufacturers to develop their own techniques and technology. Then, when it became evident that air superiority wasn't just "nice," but a necessity, the German High Command established Adlershof Test Center. Similar to our McCook Field of World War I, Adlershof Test Center was opened in order to be sure that the German air arm received the very best that industry and the military could provide.

In 1917, with the U.S. finally into it, everything was stepped up. Not that the Germans had anything to fear in the way of superior advances in American war materials and technology; they recognized the sheer volume of money and fresh flesh that was now available.

Late in 1917, Adlershof announced fighter aircraft competitions, and invited manufacturers to submit single-seat fighter designs to a grueling test, not only by the Center, but by combat-experienced pilots. These trials were scheduled for January 1918.

By January 1918, Generals von Hindenburg and Ludendorff had decided ■■ a campaign which they hoped would bring the war to a close, before the full effect of American manpower could be felt. The Americans, although slow to start, were getting up a full head of steam. And for the Kaiser, time was of the essence.

Tony Fokker entered several designs in the January trials. Among them was one submitted under factory designation V. 11.[1] A biplane, it was the hands-down favorite with officials and pilots, and was rushed into production under the military designation Fokker D. VII.[2]

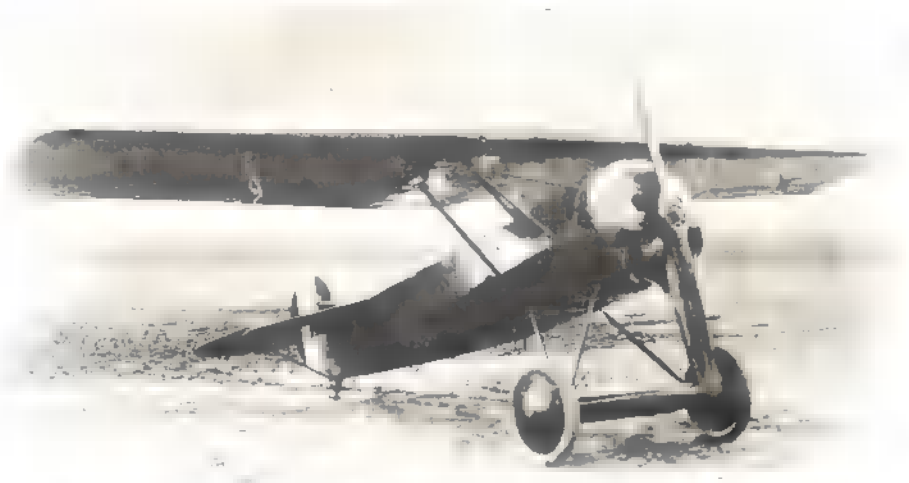
The impetus of the competitions having pushed technology with such good results, a new series of trials was announced for the spring. Fokker would send ■ mixed bag. And in it would be a parasol wing monoplane.

When Fokker returned to Schwerin, he looked over the stable of experimental models on hand, and discussed the up-coming trials with his Chief Designer, Rheinhold Platz. The two worked together as one—Platz, the born designer, complemented Fokker, the born experimental test pilot. And theirs was a completely practical approach to aeronautics.

Neither Platz nor Fokker were school-trained engineers. Fokker couldn't be bothered with complex aerodynamic formulae, laws, rules, regulations—mathematical *or* military. Nor did he believe in pressing any unnecessary data onto his employees. No sense in mucking up their heads with all that junk.

According to one biographer, Fokker and Platz worked out generalities together (i.e., "I want a triplane"—period) and then, while Platz worked out the details, Tony hustled other affairs until the prototype was ready. He never had to wait too long. Platz was a fast worker.

■ combination wing loading test and publicity shot, 1918. Although weights varied according to engine size, dimensions of the E.V/D. VIIIs were the same. Span, 27' 7"; length, 19' 4"; height, 8' 6" (at rest: ■' 8").



A D. VIII in American colors at McCook Field where it was evaluated by our Air Service. Built in Nov. 1918, the lightweight Fokker tipped the scales at 848 pounds, including its 331-pound Oberursel UR II engine. Gross takeoff weight was 1238 pounds, with 180-pound Lt. Leigh Wade aboard.

This D. VIII in Dutch markings was part of [redacted] undelivered inventory that was whisked out of Germany after the war. Lozenge pattern is quite visible. Roundel is orange with white border.

Since neither the guns nor factory markings are apparent, this is perhaps a production E. V awaiting upgrading to a D. VIII. On Nov. 1, 1918, 85 D. VIIIs were operational on the western front.

A tidy methodical Berliner, Platz was creative by instinct and had a good eye for design. He was trained by experience, and experience had taught him to keep it simple. The less complicated things were, the less problems. Not only in design and engineering, but in construction and production. And he always worked with the end product in mind.

By now, Platz had developed a fairly routine approach to his job. Once the requirements were established, he'd take out a sheet of squared paper (so the results would already be dimensioned when he was through) and, although not a flier himself, his first consideration was the pilot. The pilot, the position of the engine, fuel tanks and armament all went onto the paper first.

Then, using these estimated weights (and with the general position of the wing in mind), finding the CG came next (so that fuselage length and moments could be determined).

Platz' basic commandment was "Be neat." Good performance depended on a clean design. Get rid of unnecessary struts, wires, turnbuckles—all possible hardware (which added weight)—and bury all possible cables. The less drag, the better. This made him a firm believer in the cantilevered wing.

For the spring competitions, Fokker had asked for a light monoplane with a rotary engine. For some time, they had been experimenting with cantilevered monoplanes—high-wing, low-wing, mid-wing. Fokker's request for a rotary was purely practical, since rotaries were the engines that were most readily available to him.

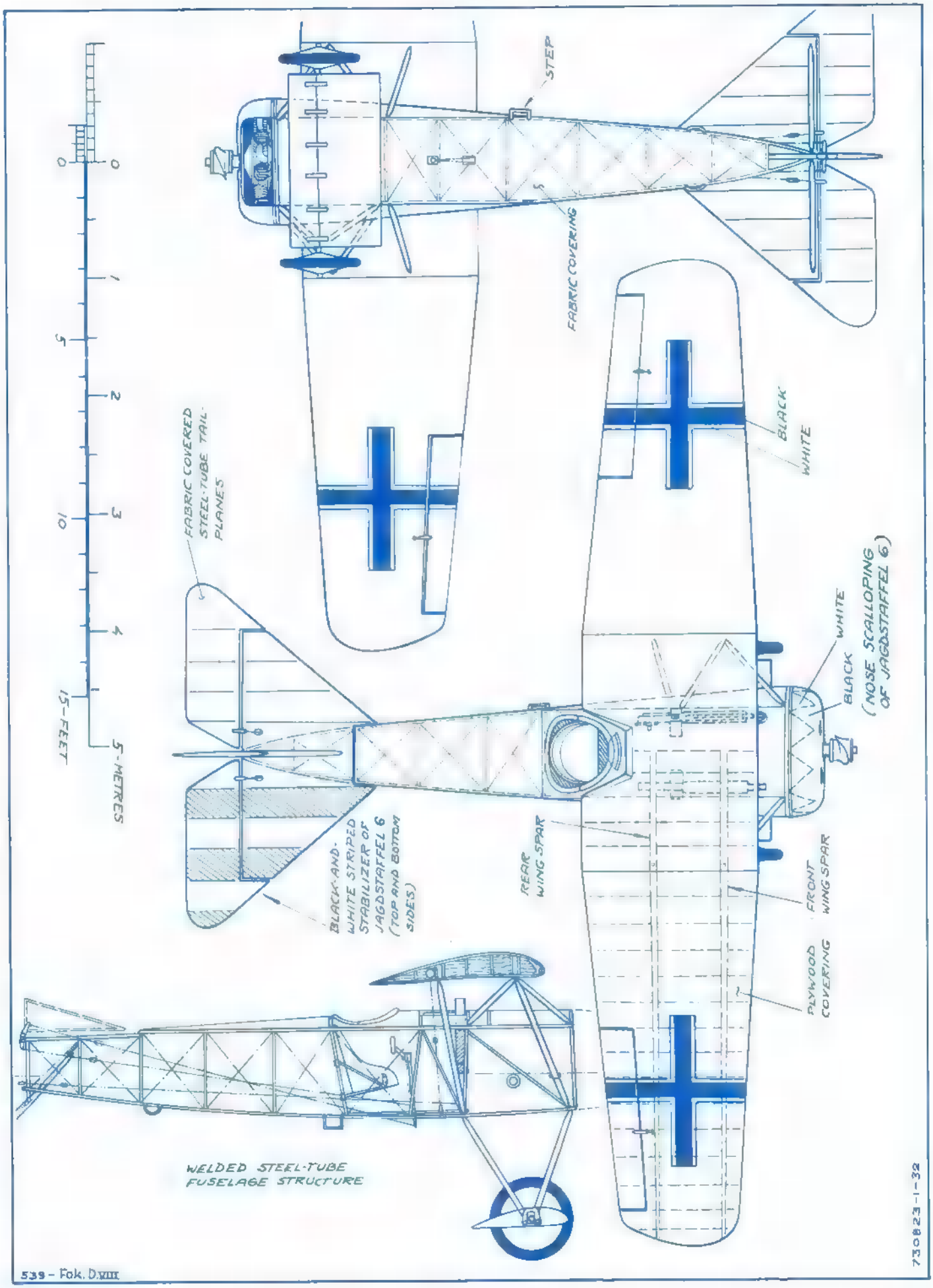
So, with all the facts before him, Platz sat down and began to sketch out the V.26. His approach to wing design was plain, practical and, by now, automatic.

Wing area was determined by dividing the estimated gross weight by the desired wing loading. The chord was determined by dividing the wing area by the span permitted by the basic structure. Chord at the tip was two-thirds of the chord at the center. And, to provide layout simplification, chord lengths had to be divisible by three or five.

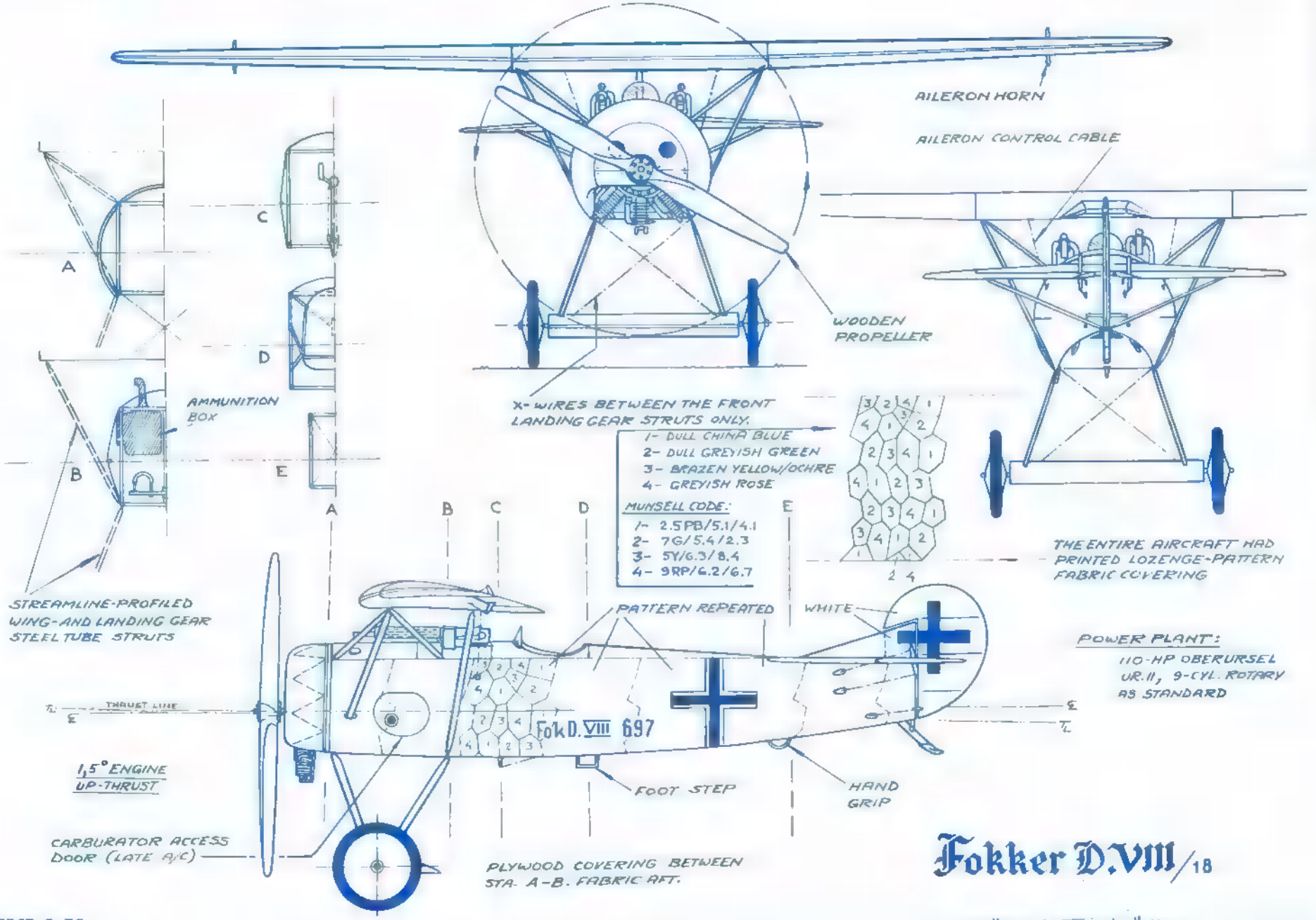
Platz' cantilevered wing got its strength from two box spars that were wide, deep and strong. The front spar [redacted] located at 1/5th of the chord, the rear at 3/5ths. On the V.26, the top and bottom caps of the spars consisted of several laminations of .39" pine strips, tied together by plywood webbing. (Well, actually, the pine strips were 10 mm thick. Remember, Platz worked in metric!)

In the V.26, ribs in the wing center section were spaced at 11.8". Rib spacing beyond the cabane structure was 12.6". His thick airfoil (which finished out at 20 percent of the chord) was determined by eye, and was the mean camber line converted to a parabolic curve. After being sheeted in a thin plywood skin (glued and tacked), small but effective ailerons were cut out of the wing.[3]

(Continued on page 81)



539 - Fok. D.VIII


AILERON HORN
AILERON CONTROL CABLE
WOODEN PROPELLER
X- WIRES BETWEEN THE FRONT LANDING GEAR STRUTS ONLY.
1- DULL CHINA BLUE
2- DULL GREYISH GREEN
3- BRAZEN YELLOW/OCHRE
4- GREYISH ROSE
MUNSELL CODE:
1- 2.5PB/5.1/4.1
2- 7G/5.4/2.3
3- 5Y/6.3/8.4
4- 9RP/6.2/6.7
THE ENTIRE AIRCRAFT HAD PRINTED LOZENGE-PATTERN FABRIC COVERING
AMMUNITION BOX
STREAMLINE-PROFILED WING- AND LANDING GEAR STEEL TUBE STRUTS
PATTERN REPEATED
WHITE
POWER PLANT:
110-HP OBERURSEL UR.II, 9-CYL. ROTARY AS STANDARD
THRUST LINE
Fok D.VIII 697
1,5° ENGINE UP-THRUST
FOOT STEP
HAND GRIP
CARBURATOR ACCESS DOOR (LATE A/C)
PLYWOOD COVERING BETWEEN STA. A-B. FABRIC AFT.
Fokker D.VIII/18
730823-2-32

getting started in R/C

SEVENTY-SECOND IN A SERIES

LEARNING TO FLY

Jim McNerney

The steps leading up to this point are pretty straightforward. You can build an airplane, install the equipment and perform a basic check-out pretty much by following cookbook-type instructions. We, and others, have discussed these steps in some detail. There are a lot of tricks and techniques to building that are learned with time and experience, but it is possible to follow step-by-step directions and come up with a presentable, workable airplane. Flying it is another matter.

The problem with learning to fly is that you have to do it right the first time—that is, unless you have a competent instructor pilot to help you. Just like learning to fly full-scale aircraft, a qualified instructor is a prerequisite. Find an experienced, safe pilot and put yourself and your model in his hands.

He will first inspect your aircraft to insure airworthiness. He will make sure that the flying surfaces are properly secured, warp-free and strong. He will check the radio installation for security, shock mitigation, control direction and range. He will also check the engine for proper mounting, power output and reliable throttle operation.

After he is satisfied that the airplane is ready for flight, he will make a short flight to check handling qualities and trim settings. These adjustments may take several flights. Don't become impatient to get at the controls. You'll get your turn. In fact, after a very few minutes of your flight, you'll be glad to hand the box back to him.

Model flying requires intense concentration. The more maneuverable, and hence less stable the model, the greater the required concentration. *You must watch the airplane constantly.* You must always know which way the plane is pointing and which side is up (anybody knows that). It's not as easy as it sounds. Clouds, background clutter, the sun, haze, distance the model is from you, its color and shape can gang up on you and create visual confusion. So watch the airplane as your instructor flies it, and get used to its various attitudes in the air.

You must learn which control functions are required to make the airplane go where you want it (now there's a profound statement). When you fly a full-scale airplane, the control inputs always relate to the attitude of the airplane with respect to the horizon. You can't do this with a model. You must perform the maneuvers relying on only your perception of the attitude and altitude of the model with respect to you.

Yet the controls with which you must guide the aircraft are just like those in a full-scale airplane. Some treatises on the subject say, "Place yourself in the cockpit." I have several thousand hours as a Navy jet jockey, and I haven't yet figured out how to put myself in the cockpit of my RC models. I guess I'm a slow learner.

The best way I can describe the problem is that you must learn to make the airplane follow a certain path through the sky and assume certain attitudes while it is following that path. The controls at your disposal allow you to change the airplane's attitude, speed and direction. You have essentially a roll control, a pitch control, yaw control and a thrust control. You must learn how these controls combine to make the airplane do your bidding. You will notice that we have avoided talking about "rights" and "lefts." This kind of restricted thinking leads to the use of such crutches as pointing the antenna of the transmitter in the direction of flight.

A typical novice syndrome is the feeling that you must manhandle the plane around the sky. The servos and control surfaces will do the work for you. Very little control stick movement is required for most airplanes, so don't over-control. This leads to unusual attitudes, confusion and crashes.

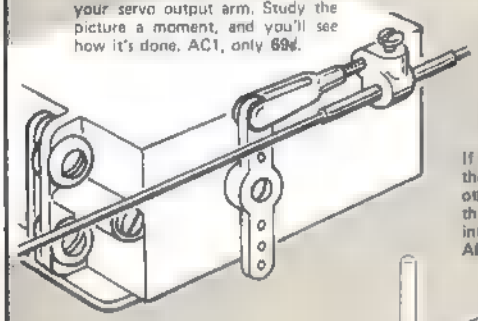
This is not intended as a guide to flying RC. Its real purpose is to get you thinking in the right vein, so that you will be receptive to good flight instruction.

CARL GOLDBERG

3 NEW AILERON FITTINGS!

AILERON COUPLER

At last, a simple way to couple conventional aileron pushrods to your servo output arm. Study the picture a moment, and you'll see how it's done. AC1, only 69¢.

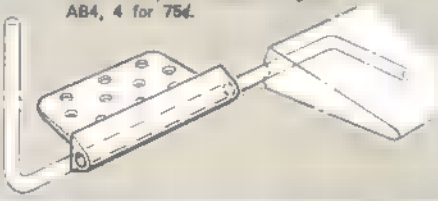


KLETT AILERON PUSHROD EXITS

A beautiful new fairing where the aileron pushrod exits your wing. Roy Klett again has used his special quality touch to produce the finest item of its kind. PEG 3, 2 for 69¢.

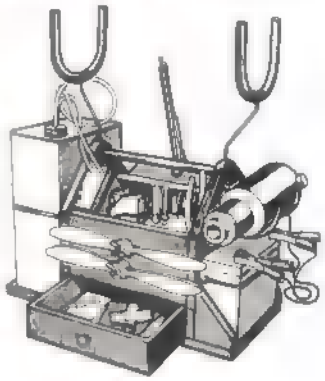
KLETT AILERON HORN BEARING

If you like precision fits, ask to see the Klett horn bearing. Superior to others, it reduces play, and has a thin tapered tab to facilitate entry into a slot, and holes for glue. AB4, 4 for 75¢.



NEW!

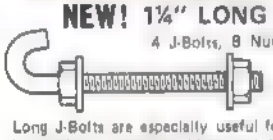
THE RIGHT-AND-LIGHT FLITE BOX
HANDI-TOTE!



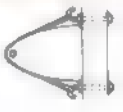
Here's a Flite Box that won't give you a hernia! Compact like you won't believe, yet room for everything you need. HANDI-TOTE was designed by Bob Rich, a practical modeler who flies a lot and travels around (he's our field representative!). Kwik-Assembly kit HT1, only $14.95.

NEW! 1¼" LONG J-BOLTS

4 J-Bolts, 8 Nuts, 8 Washers LJB6 69¢



Long J-Bolts are especially useful for holding tanks in place as illustrated here on profile fuselages.



1/2" J-BOLTS. JB8 4 for 36¢.

NYLON TAILWHEEL BRACKET

The simplest mounting yet—just cut a slot in the rear bottom of the fuselage, smear epoxy on the glue tin, into place. TBI—40¢

NEW! Spring Steel E-Z LINKS with 10" Rod 39¢ Each, or 6 for $2.25. New E-Z LINKS not only save you money, but are made of spring steel and have quality threads that work smoothly without galling. The hardness is just right, too — not too soft.

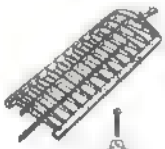
E-Z LINK, complete with 10" rod — EZ1 — 39c ea. 6 for $2.25

Spare LINK RODS Strong, quality threaded rods to work in 2-56 clevis. Rod hardness just right LR1 - 6 for 59c.

E-Z LINK, less rod — 2 for 59c.

NEW! CG LOW BOUNCE WHEELS With SHARP, CLEAN RIB TREADS and TOUGH, LONG-WEARING HUBS. From 1-13/16" Dia. on up, all wheels take standard brakes... 7 sizes—1-3/8" to 3-1/8". From **$1.89 to $3.19 pr.** Tested and proved in the field by famous fliers, we believe you, too will be pleased by these very attractive new CG Low Bounce Wheels. Ask your dealer to show you the size you want.

REPLACEMENT FOAM WINGS, ETC. Ranger 42 foam wing gets you in the air quickly—$4.95. Stab and vertical fin, set—$2.50. Assembled Ranger fuselage, plus bearers, etc.—$10.95



WING KITS For Falcon 56 and Skylark 56. Can be used on either ship.

For Sr. Falcon. Easily built, strong. $3.95

Skylane, $4.95

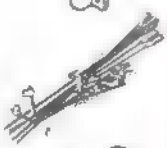
AILERON BELLCRANK Has steel bushing so crank can be screwed firmly in place without binding. 50¢ for 2 AB1

UNIQUE SNAP LINK! Patented. Tiny 45° shoulder snaps through arm, prevents accidental opening. Snap-Link with rod 29¢. Mini-Snaplink with rod 29¢. Either one, less rod—2 for 40¢.

NYLON STEERING ARM Hardened steel collar and screw. 75¢ SA1

STEERABLE NOSE GEAR Complete Steerable nose gear with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers. $2.50 GI6N

NYLON BEARING One piece design, no alignment problems. Includes nuts, washers 75¢



NEW—MAJOR R/C FITTINGS R/C Fittings Set No. 1 for ship with standard ailerons $1 R/C Fittings Set No. 2 for ship with strip ailerons $3.50 RFS2

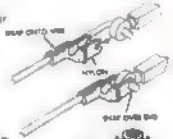
SHEET METAL SCREWS Like wood screws, but better. Sharp threads, hard. Includes washers—#2x5/16—30¢ for 10. SMS2 #4x3/8 —30¢ for 8. SMS4

5/32" ADJUSTABLE AXLE Adjustable axle allows you to easily have the strut length you want. Both the axle and screw are steel. Just file a flat on the strut, and tighten axle in place. 75¢ ea. AA1

ENG. BRACKET for "20". EB1

KLETT HINGES — WORLD'S FINEST! Small RK2 hinges are as thin as a knife slit. Regular size RK3 hinges are the slickest you've ever seen. Removable pins.

RK2-7 7 for $1.10
RK3-7 7 for $1.25
RK2-15 15 for $1.95
RK3-15 15 for $2.35



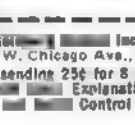
KLETT SAFETY DRIVER Can't slip off and damage your wing! Large for 1/4" Nylon Screws. Small for No. 10 Nylon Screws. 98¢ ea.

Large SD1 Small SD2

KLETT PUSHROD EXIT To protect fuselage and insure smooth operation of pushrods. Tough nylon. Two sizes—large for 5/64" wire, small for 1/16" wire.

PEG-1 Large 4 per pkg. 75¢
PEG-2 Small 4 per pkg. 75¢

NYLON TAPE Extremely tough when applied with epoxy. 2½" wide x 5 ft. 50¢. 3/4" wide x 5 ft. N1



SNAP'R KEEPER Quickest, handiest way to safety pushrod wire end to servo, etc. Easy to use, but has tremendous holding power. Works on wire 3/64" to 5/64" diameter. 6 for 50¢ SK1

4-40 BLIND NUTS— 25¢ for 4. BN4

1/2A BELLCRANK and HORN Nylon provides smooth 1/2A control line operation. Easy on dacron lines, too. 25¢ BCH1

1/2A FLYING LINE Dacron Thread—56 ft. Strong, min. stretch. For small control-line models, hinging, etc. 25¢ HL1

CONTROL HORNS Upright part rises from of Long horns or short, with 50¢ for 2.

Long CH1 Short CH2

For best service, see your dealer for items you want. If not available, write direct: 50¢ per item ($1 outside U.S.). Minimum order $1.

MANUFACTURERS—All our accessories are available at excellent O.E.M prices. ALL ITEMS AVAILABLE IN CANADA

Carl Goldberg Models Inc.
4735 W. Chicago Ave., Chicago, Ill. 60651
I am sending 25¢ for 8 pg. Illustrated Catalog Explanation R/C Equipment Control Definitions.

Name _____
Address _____
City _____
State _____ Zip _____

CARL GOLDBERG MODELS INC.
4735 W. CHICAGO AVE. • CHICAGO, ILLINOIS

OUR Flite Pak Kit will work with YOUR transmitter!

CANNON

EK

HEATH

KRAFT

MRC

ORBIT

RCM

ROYAL

PROLINE

WORLD

OR ANY OTHER MODERN DIGITAL TRANSMITTER

1-8 FLITE PAK

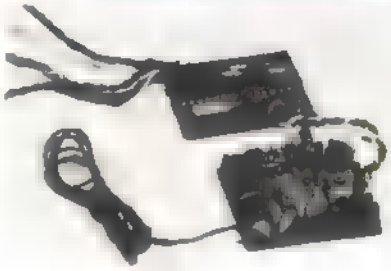
12G18-2	1-8 FLITE PAK w/2 BANTAM SERVOS	$74.95
12G18-4	1-8 FLITE PAK w/4 BANTAM SERVOS	$114.95
12G18-2L	1-8 FLITE PAK w/2 LINEAR SERVOS	$76.95
12G18-4L	1-8 FLITE PAK w/4 LINEAR SERVOS	$116.95

The Digital Commander series of kits are designed to be compatable with any modern existing system and offer expansion within the system without the need to buy a complete outfit.

The Flite Pak comes complete with One-Eight Receiver/Decoder, plastic case, number and style of servos specified, switch, and connectors. All you need for building except batteries.

Will operate with any modern digital transmitter on the same frequency. Frequencies available are: 26.995, 27.045, 27.095, 27.145, 27.195, 53.1, 53.2, 53.3, 53.4, 53.5.

1-8 RECEIVER



12G18 1-8 RECEIVER/DECODER KIT $34.95

This receiver features voltage regulated circuitry with AGC and a double tuned front end. An 8 bit shift register in the IC decoder offers up to eight channel operation of positive of negative pulse servos with three or four wires.

Plastic case measures 1.45 x 1.72 in. Weight is 1.4 oz. Connectors are not furnished. Available on 27 and 50 mHz. Please specify frequency.

SERVO

An IC servo amplifier and the popular D & R servo mechanics combine to make a servo that gives superior resolution and rapid transit time. Will operate with 3 or 4 wire IC decoders with positive pulse output.

Available in Bantam (rotary output) which measures 1 1/2 ■ 1 7/16 x 3/4 in or Linear (linear ■ rotary output) measuring 1 13/16 x 1 7/16 x 7/8 in.

14G20	BANTAM SERVO KIT	$21.95
14G20L	LINEAR SERVO KIT	$22.95

DIGITAL COMMANDER

THE SENSIBLE APPROACH

ADD $5.00 FOR RECEIVER/DECODERS AND FLITE PAKS ON 72 MHZ.

AVAILABLE ON: 72.08, 72.16, 72.24, 72.32, 72.40, 72.96, 75.64.

Technical literature available upon request.

Complete catalog-- $1.00

ACE R/C

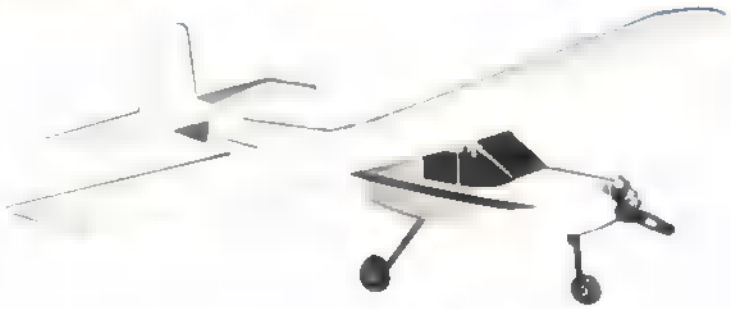
pulse commander

A QUALITY PULSE PROPORTIONAL RUDDER-ONLY SYSTEM FOR THE NOVICE AND SPORT FLIER.

Due to its small size, lightweight, simplicity, and low cost the Pulse Commander offers an ideal system for someone on a budget wanting to get into R/C flying or needing a second system for fun flying. Flight pack weights start at 2.5 oz. for the Baby System which is small enough to go into .010 powered planes.
Units are completely wired and tested with airborne nicads and charger.

AVAILABLE ON: 26.996, 27.045, 27.095, 27.145, 27.195 mHz

10G15—Baby System, $59.95
10G15T—Baby Twin, $62.95
10G16—Standard, $61.95
10G17—Stomper, $64.95



13L100 DICK'S DREAM KIT $8.95

dick's dream

AIRPLANE FOR THE BEGINNER AND SPORT FLIER. DESIGNED FOR THE BABY BABY TWIN SYSTEM.

SPAN: 32 in.
AREA: 175 sq. in.
LENGTH: in.
WEIGHT: 12 - 14 oz.
POWER: Pee Wee or Tee Dee .020

USE THE COUPON TO GET OUR HANDBOOK/ CATALOG WHICH EXPLAINS THE PULSE PROPO CONCEPT AND LISTS OUR FULL LINE.

ACE R/C, INC. • BOX 301 • HIGGINSVILLE, MO. 64037

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
BankAmericard/Mastercharge Number _____

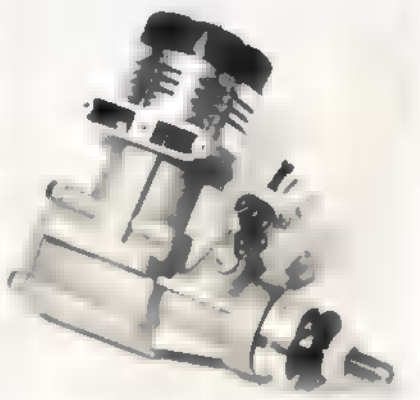
QUAN	CAT. NO.	ITEM	PRICE	TOTAL
1		CATALOG	$1.00	$1.00

ADD $1.00 for handling on all orders except catalog.

ACE R/C INC.

AAM TESTS

MERCO 61 MK IV
DON JEHLIK



The test engine is another of ■ number of quality RC 60 engines on the market today. Of conventional layout, it is powerful and easy to run.

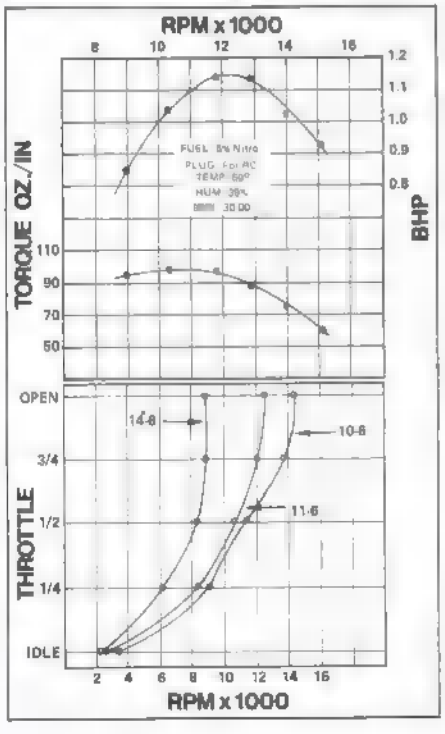
Design features include a baffled piston, hemi head and really long shaft induction period (more about that later). The wrist pin holes in the piston are bushed as is the rod. The piston has ■ single ring and two bypass transfer holes drilled in the skirt. The RC carb is of conventional layout and proved easy to operate.

Instructions with the engine were complete. A special note on the throttle operation was included and, when followed, made the sometimes-difficult task of proper adjustment easy. Instructions recommended ■ 3:1 alcohol: castor oil break in fuel to be followed by a 4:1 mix or 75% alcohol, 20% castor oil and 5% petrol (gas). I didn't feel this followed usual practice here in the U.S. so I ran the engine on a 5% nitro, 20% Klotz, 75% alcohol fuel.

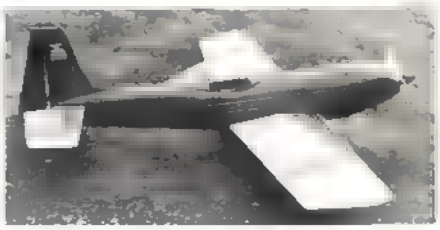
Break in of 1/2 hr. seemed more than adequate. The piston ring seated immediately and this is one engine that could have been put in ■ plane and flown after the first test run. Hand starting was not consistently easy, but the "combination" for hand starts sometimes included waiting until the engine had cooled down.

(Continued on page 111)

Price as tested—$62.95; **Manufacturer/Importer**—Royal Products Corp., 790 West Tennessee Ave., Denver, Colo.



SPINKS ACROMASTER
HOBIE STEELE



Building the Spinks Acromaster was a real pleasure for me. Although it was my first foam wing ship, I had no real problems. Some previous RC experience is necessary, but I believe that the Acromaster would make a great first low-winger, like the ads say.

The Acromaster kit comes with hinges, rudder and elevator horns, vacuum formed wheel pants with screws for dural landing gear and a beautiful canopy. Materials are excellent. Balsa sheeting for the double-tapered wing was medium grade and straight, while formers were appropriately hard balsa. Blocks which form the rounded fuselage top were properly soft, and cowling parts somewhat harder. Plywood fuselage doublers and other plywood parts are cleanly die-cut, as is the balsa. Firewall is machined 1/4" ply.

Parts are identified on the plan, instead of being printed ■■ the parts themselves, and the larger blocks and parts are identified by size, so be sure to measure as you go along to keep from putting the right piece in the wrong place. Two typographical erros in the plans were: front wing holding dowel is identified in one place ■■ 1/8", and as 5/16" elsewhere —use 5/16"—also designations of stabilizer and elevator were transposed.

Fuselage construction is strong, moderately light, and practically idiot-proof, since it's built ■■ a full length jig which becomes an integral part of the structure. It ■■■ together ■■ easily that I was able to build it with two broken fingers ■■ my left hand! There's also plenty of room for any electronics you might have.

The wing has strip ailerons, which look like diminutive two-by-fours until spot glued to the TE and worked over with a razor plane and sure-form tool. My sense of accomplishment was profound as the square stock in both wing and fuselage quickly assumed the bold curves of a beautiful, high performance aircraft.

I used one-coat-type covering material on wing and stab, with silk and dope on the fuselage. It would have been nice to have had three-views of the real plane with a stand-off scale kit like this, but none were readily available, so I striped it with vinyl tape on the wheel pants (since masking tape tended to lift the color off the plastic). It's necessary to sand the wheel pant halves so that epoxy glue and dope stick.

Although Hobby Shack specifies 21-40 engines, I used an old but peppy ST 45, which appeared to be just about right for my type of flying. I'd say a hot 35 should yield reasonable performance.

The landing gear bolts to the fuselage just ahead of the wing, which eliminates all landing shock to the wing itself. Being accustomed to "milking stool" tricycle landing gears, I was somewhat apprehensive about this, my first tail-dragger in many years. After taxiing a bit, I opened the throttle, held a little up elevator, and the Acromaster literally took itself off nicely. Take-offs are "rail-straight" and landing speed is moderate. Control response is good and rudder quite effective for snaps and other crowd-pleasing maneuvers. With a competent pot twitcher on the stick, the Acromaster will perform a respectable pattern.

Although ■ fine flier, the Acromaster's forte is *good looks*. No amount of contest hardware means any ■■■ than having your peers gather round a really beautiful new ship and say "Wow." It happens with my Acromaster, and I love it!

Specifications: Wing—Semi-symmetrical, 432" sq., 54" span; **Engine**—21-40; **Weight**—4½ lb., ready to fly; **Price**—$32.88 plus $2.75 postage; **Manufacturer**—Hobby Shack, 6475 Knott Avenue, Buena Park, California 90620.

PRONTO
PAT MURPHY

The Pronto is a very impressive little airplane. It is extremely versatile and rugged. Even though it is a low wing, conventional geared plane, it is gentle enough for a beginner's trainer. In the hands of an expert, the Pronto can loop, roll, spin or most anything else that the pilot may ask of it. It will penetrate suprisingly well with a 15 and still is gentle and easy to handle with a 25.

The flat bottom airfoil makes it easy to build ■ straight wing. The leading edge is a 3/8" pine dowel, and the 10 main ribs are cut from 1/8" balsa. The tip ribs and center section ribs are cut from 1/4" balsa. Very little sanding or shaping is required to build and finish the wing. The stab, fin, elevators and rudder are cut to exact shape and need only sanding to finish. They are cut from good grade, lightweight 3/16" balsa.

The fuselage is ■ simple box, with all the parts machine cut. The formers are five-ply plywood, machine cut and are packaged in a vinyl envelope. All of the small balsa blocks are also packaged in this envelope. Almost all the hardware necessary to build and complete this plane is included: clevices, screws, control horns, hinge material, bolts and Kwik-Links are in the kit. A 1/8" music wire landing gear and tail wheel bracket are also in the kit.

The Pronto is a high quality kit that can be built by the beginning modeler, or it can be completed in only three or four nights by an experienced builder. The plans and instructions that are included are very good and easy to follow.

The Pronto is a great little airplane that is easy to transport, even in small cars. It is easy to fly, even at a limited space flying site. It can be enjoyed by nearly anyone who has just a little propo radio flying experience.

This Dave Robelen design will probably be around for quite ■ while.

Specifications: Engine—Astro 10; **Wingspan**—50"; **Wing area**—400 sq. in.; **Length**—38"; **Weight**—2 lb. 12 oz.; **Price as tested**—(kit) $18.95, (motor system) $60.00; **Manufacturer**—Tidewater Hobby Enterprises, 4118 Middle Ridge Road, Fairfax, Va. 22030 and Astro Flight, Inc., 13377 Beach Ave., Venice, Calif. 90049.

FUTABA CONTINUED

manufacture is used for the decoder. A plug-in crystal allows frequency change.

SERVO: Certainly the most outstanding part of this system is the FP-S4 servo. We are totally impressed with it. Both mechanically and electronically they are new and unique. You may have seen pictures from Toledo and elsewhere of the demonstration of these servos operating under water. Each of the sections of the servo case is sealed at the periphery with an "O" Ring as is the output shaft. Further there is no way for water to get from the gear train housing to the electronics if a leak occurred in the upper section. So who needs it? Not many, since RC submarines aren't too common, but these same seals will keep out fuel and dirt both of which can "kill" ■ servo. The gear train is very smooth and the gears are quite thick and therefore rugged. And well they should be because this servo puts out 7½ lb. of thrust! The high thrust results largely from the servo amplifier which can pass a rather high current. Two integrated circuits are used. One is ■ 12 pin IC

(Continued on page 111)

FUTABA FP-2D
DUANE LUNDAHL

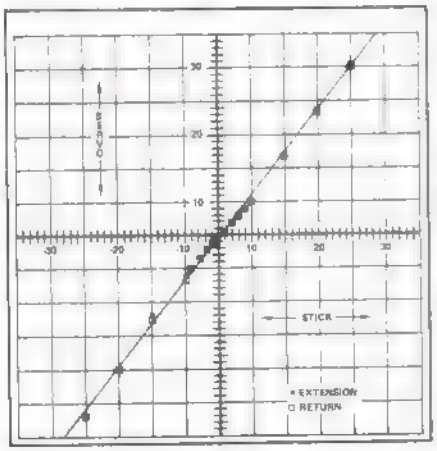
The subject radio is one of the series of new radios being imported from Japan by Futaba. It is the lowest cost of a line which offers two-, three-, four-, five- or six-channel operation. A complete set of accessories including servo mount trays, extra output arms, frequency flags, etc. are included. Dry batteries power both the transmitter and airborne system.

TRANSMITTER: Two single-axis sticks are used to control the two channels; the right stick operates in a horizontal plane; the left in the vertical. The sticks are spring loaded to center, however, the parts are furnished to modify the left hand stick to a ratchet type non-centering action for throttle control. Power for the transmitter is supplied by eight AA pen cells which give a 12 v input. The circuitry is straightforward and board layouts are very neat. A plug-in crystal is used for ease in frequency changing. A clever innovation is the provision of a minature jack on the transmitter and patch cord which allows the flight pack to be plugged into the panel meter of the transmitter thus allowing a voltage reading. Since dry batteries drop in voltage in a fairly linear manner as they are used up it is thus possible to know when they must be replaced. (This arrangement wouldn't work well with NiCads as they hold their voltage almost to the end and "die" suddenly.)

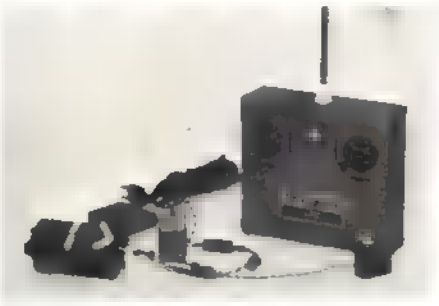
RECEIVER: The receiver is unusual in that it has a single-tuned front end. We suspect this might effect sensitivity, however, the measurements showed a 3 micro volt signal gave stable output. There are more sensitive radios but 3 micro volts is quite adequate. The conventional 3 stages of IF are used. An integrated circuit of Japanese design and

(Continued in column 1; page 41)

Specifications: Tx current drain—120 ma @ 12V; **Pulse width**—1.5 ms ± .5 ms; **Rx current drain**—22 ma @ 6V (4 ea. 1.5V AA cells); **Sensitivity**—3 mv for useful signal; **Servo thrust**—7.5 lb. @ 1/4" radius or 30 in.-oz. torque; **Transit time**—0.5 sec. for 90° rotation; **Price as tested**—$119.95; **Manufacturer/Importer**—Futaba Industries, U.S.A., 630 West Carob St., Compton, Calif. 90220.



EK LOGICTROL LRB
FRED MARKS



TEST SYSTEM: Four channels; transmitter, brick receiver/decoder with three internal servos, one external, nickel-cadmium airborne pack, external charger for airborne pack; transmitter used 9 v dry battery. Test set was on 72.32 MHz but available on all 27 MHz and 72 MHz frequencies.

TRANSMITTER: Two sticks, closed gimbal of molded plastic. Vinyl covered aluminum case. Discrete component encoder. Separate RF and encoder boards. Cermet pot elements used in molded stick assemblies. All wiring nicely laced. Positive molded plastic antenna mount. Level meter indicates approximate battery condition.

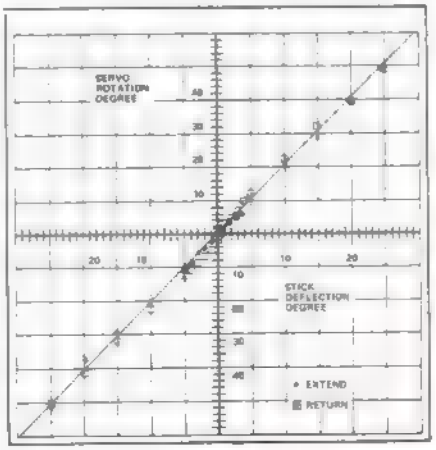
RECEIVER/BRICK: Airborne brick unit contains the receiver on one deck and decoder and two IC servo amplifiers on second deck. The unit is an adaptation of the LRB-2 and a third servo with its own IC amplifier and double tuned front end and standard 455 MHz IF. Decoder features TTL IC's with decoding done by 8-bit shift register.

THE SERVOS: All four servos use Texas Instruments/EK IC servo amplifiers with two external output bridge PNP transistors (NPN's are on the chip). Plastic feedback pot elements are used. The fourth-channel external servo is the EK Mini servo that has smallest dimensions of any current servo mechanism. All outputs are rotary only. The throttle output is coupled to a slave lever that permits throttle hookup from either side of the brick.

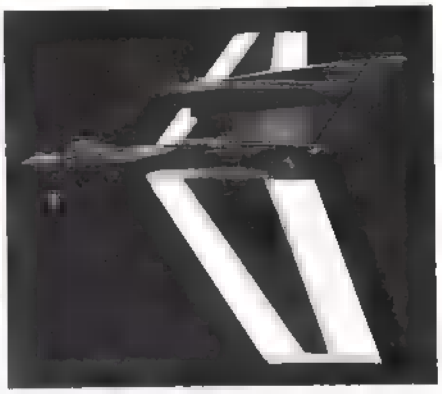
EVALUATION: The test set performed satisfactorily under all flight conditions. Operation was satisfactory from 10°F to 150°F. The sticks are not exceptionally precise at neutral. The feature permitting ready connection of throttle adds flexibility to the brick installation. Feature that permits coupled or separated aileron and rudder is convenient. Overall, a good solid sport flier system that gets you there for not a lot of money.

(Continued on page 111)

Specifications: Pulse Width—1.4 ms; **Pulse Rate**—70 per sec.; **Trans. Current Drain**—120 @ 9V; **Servo Transit Time**—0.6 sec. for 90°; **Servo Thrust**—2.6 lb. @ .4 in. = 0.8 in.-lb. torque; **Temp. Range**—10-150°F; **Airborne Weight**—11.25 oz.; **Price as Tested**—$199.95. **Manufacturer**—E.K. Logictrol, 3233 Euliss Blvd., Hurst, Texas.



THE GRYPHON & SHRIEK
PAT MURPHY



One of the more intriguing aircraft designs has always been the flying wing. It always looks as though there should be no pitch or yaw stability. Most modelers will go out of their way for a look. To build and test two at once is a chance not often found and, most assuredly, not one to be turned down!

These two airplanes are built on the same wing plan with only two or three minor structural changes to make the Gryphon (glider) wing strong enough for the powered version, the Shriek. The Gryphon fuse is built on to the wing, whereas the Shriek fuse bolts on to the wing. This makes the Shriek a little easier to transport. The radio in the Gryphon is accessed through the hatch on top of the fuse. The radio hatch on the Shriek is on the bottom of the fuse, just forward of the wing.

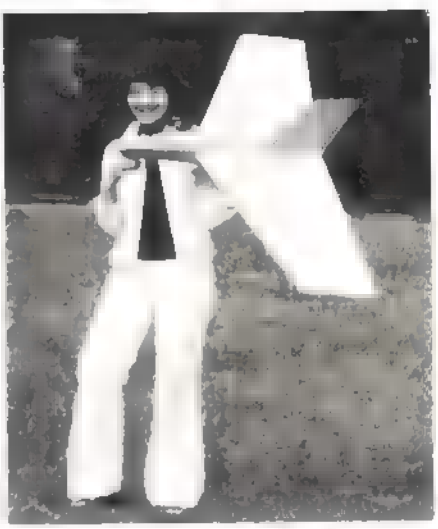
The kits tested had the most accurate machine cut parts of any kit I have ever tested. The wood is lightweight, top quality balsa. The only real cutting and sanding required is in rounding the corners of the fuse and the leading edge of the wing.

A very complete and good quality hardware package is included in both Model Dynamic's kits. They include the clevices, control horns, snapper keepers, all bolts and screws, and the threaded rod required to build the necessary control pushrods.

The instructions included in both kits are thorough and complete, down to some very important trim and flying instructions. Both kits use a modular construction method, which is extremely easy to follow. The average modeler, following the instruction sheet, can probably build the wing in as little as three or four hours. However, one does

(Continued on page 111)

Specifications: GRYPHON: Wingspan— 67"; **Wing area**—887 sq. in.; **Length**—34"; **Engine**—none (pod available); **Weight**—2½ lb.; **Radio**—2 channels; **Price as tested**—$34.95. **SHRIEK: Wingspan**—67"; **Wing area**—887 sq. in.; **Length**—34"; **Engine**—29-46; **Radio**—4 channels; **Price as tested**—$55.00; **Both Manufactured by**—Model Dynamics, P.O. Box 2294, Orange, Calif. 92669.




The Super Servo.
FUTABA
IC
SERVO
FP-S4
The FP-S4 is Futaba's Super Servo.
detecting the most
voltage fluctuation. And
of Tantalum
the
The FP-S4
outside too.
tures to its 42
strenuous use.
And the
is now available with all Futaba two and three
The FP-S4 is just one of
high performance
including the FP-S
mini servo, the
S5L
servo, and the
servo.
carries
same
of
and
And the same 6 month parts and labor
Service Center.
FUTABA
Futaba
Futaba Industries, U.S.A.
West
Street

SAAB J21-A

This WWI Swedish fighter adds
a refreshing twist to military Stand-Off Scale.
by Fred Angel

Maybe those tall, leggy, blonde Swedes in *Playboy* got to me. Maybe it was because I really couldn't pronounce that name with my New England twang. Maybe it was the raised eyebrows and the cynical sneers when I suggested the project to my flying buddies. Whatever the reasons, I just had to build that Saab. The three-views of this unusual fighter kept flashing through my mind.

"Three-views flashing in a near vacuum is a sight to behold and a joy forever!" my wife said.

Finally, after weeks of muttering words like "pusher" and "twin booms" and "I wonder if. . .," my kids dragged me to the workshop and barred the door with: "Now, build the thing!"

As I started to lay out the aircraft, it became obvious why it had so much appeal. Man, it had "class." Take a pusher-fighter with rakish lines, a generous wing and tail area, a trike gear and twin booms, add clean scale details and a simple color scheme, and you have a stand-off ship that is sure to give you a chance at any contest. Or, if you're not ready for the contest scene just yet, make a low flying pass at the local field and then brace yourself for those long, leggy, sweet things high-stepping out of those racy sports cars.

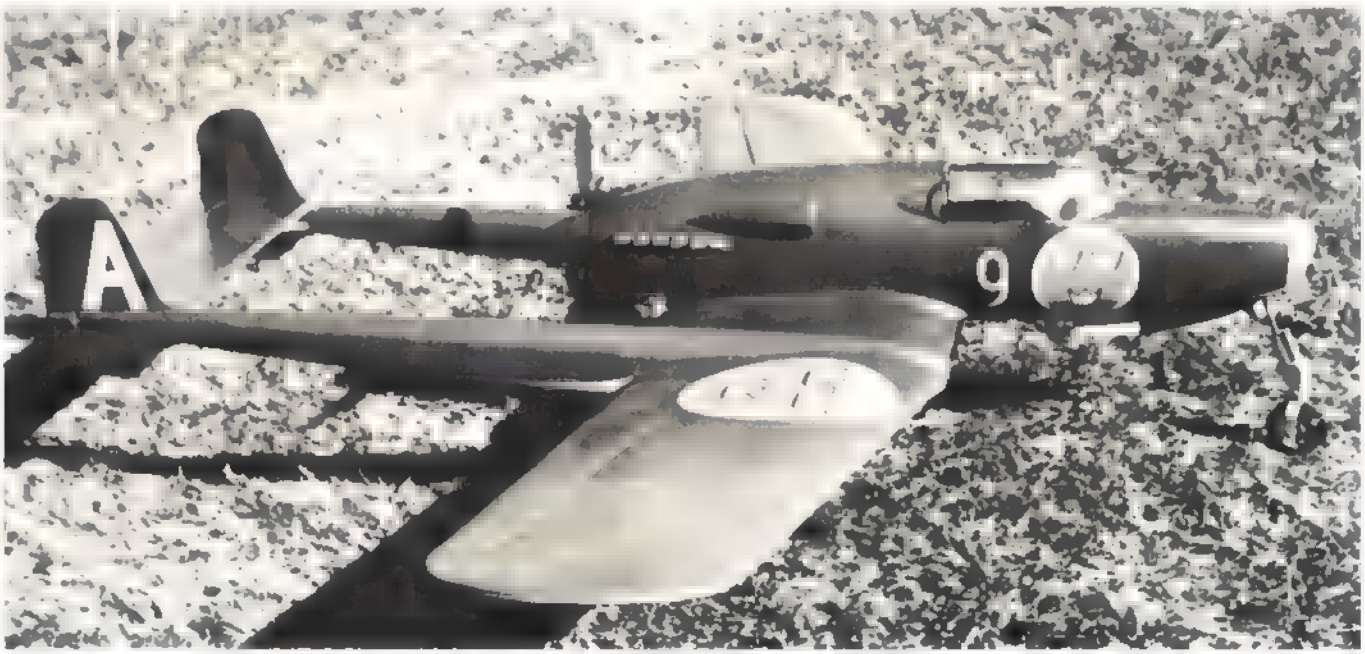
The remarkable thing about this model was that, ready to fly, the weight was only four and one-half pounds! Test flights convinced me that a slightly smaller version would fly equally well on less power. Consequently, the plans offer ■■ option of wing sizes and power choices. The larger version flew cleanly with an Enya 45 and a Tornado 10 x 6 pusher prop. The smaller version, which was thrown together in a hurry with no attempt at beauty, did just as well on a 35 and a Grish three-blade pusher.

O.K., let's build. Carefully select your balsa for building and try to keep the tail light. To achieve the correct balance, it was necessary to fly with the landing light batteries and three ounces of weight in the nose. Don't worry about adding weight, the large wing area can take it.

Get a copy of *Profile Publications No. 138* for reference. With that tacked up on the wall, the plans laid out in front of you, and a peanut butter and jelly sandwich at your elbow, you're all set to start with the fuselage. Cut out a matching pair of 1/8" medium-hard balsa splines as shown on the top view, and cut out all formers. Also cut the top and bottom keels from 1/16" plywood. Mark the former positions on the keels, splines, and the maple motor mounts. Mix up a batch of epoxy, and glue formers F-3 through F-6 to the motor mounts. This will give you a crutch, on which to support the splines and top keel.

After the epoxy sets up, white glue the splines and the top keel. Then add formers F-1, F-2, and the bottom keel. When everything is dry, you can plank or sheet the framework. If you are adept at planking, do it! I've found that it is just as easy to sheet compound curves using the following technique.

Select a "bendable" sheet of 3/32" balsa, spray with hot water, and glue to formers F-1, 2, and 3, and along the side splines. Note that the glue joint on F-1 stops just under the side canopy. Hold in place with masking tape and pins. Now cut a "V" in the top of the sheet from F-3 to F-5, and start shaping the



An apt subject for Stand-Off Scale, the Saab has pleasing lines and above average flight capabilities. The J21 would be an excellent choice for a first sport scale project.

sheet down to the curve of the formers with your fingers. By cutting and fitting, you'll be able to form the sheeting into a neat curve.

When satisfied with the fit, coat the formers with glue and tape the sheet to them. Don't worry about any gaps where the sheeting meets. This can be filled in as described later. Now add a few scrap strips to the bottom of the splines and do the bottom section. Next, rough-cut the nose and top cowl blocks to shape and spot-glue in place. Grab your razor plane and a mess of sandpaper, and sand to shape. Carefully remove the blocks after sanding.

Before hollowing out the top cowl, use this to prepare a mold for the bottom cowl. Stretch a piece of rubber balloon over the block and thumb-tack to the bottom. Next, coat the surface with Vaseline or wax. Steal a shoe box from what's-her-name's closet and glue in a divider, so that you'll have a compartment with about an inch or two all around the cowl. Then place the waxed cowl (bottom down) in the compartment, and screw in place through the bottom of the box. Make sure that the back side of the cowl is against one end of the box, so that you'll have a form that is easy to lay-up.

Now mix a batch of plaster of paris and pour it over the plug. When set, rip off the box, remove the plug, and lay-up your fiberglass. Hollow out the cowl block and nose blocks, and mount in place. Be sure to fit the engine and install the mounting nuts before securing the cowl.

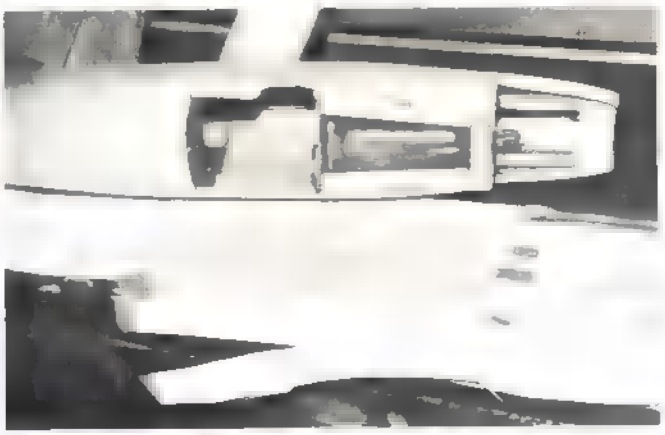
All that's really left is the installation of the nose gear plate, the strips for attaching the bottom cowl, the wing attachment block, and the hatch detail.

Now that the old body is taking shape (no pun intended) and your enthusiasm is building up, let's form the canopy. Shape the forward canopy and the two side canopy forms from balsa or pine. If you carefully cut the section of sheeting from F-1 to F-2 at the point just below the bottom of the side canopies and glue in a couple of end pieces, you'll have the top canopy form all set to go. Glue in some scrap supports to elevate the forms and clamp the pieces to your kitchen table. Then, using heat-forming canopy plastic and an oven, you can pull the material over the forms. For those of you who haven't tried this before, it is simply a matter of laying a sheet of clear plastic on a tin-foil covered cookie sheet, and broiling in the oven for a few seconds. Waste a scrap piece first to get the feel of the material, and wear gloves or you really will! You will need an extra pair of hands to make sure the plastic is stretched evenly down over your forms.

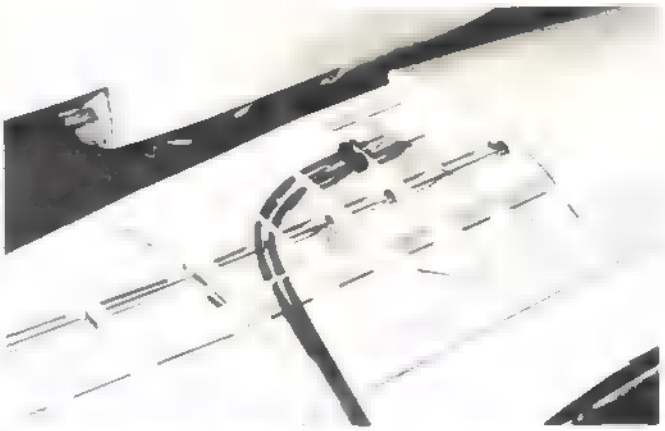
The wing is a three-piece unit, with dihedral in the outer panels only. Build the center section first. Pin down the 1/4 x 3/8" center spars and glue in the top half-ribs as shown. When dry, remove from the board, turn over and glue in the bottom half-ribs. Glue the shaped trailing edge strip in place. Next, cut the front of the ribs to the angle shown, and glue in the 1/8 x 3/4" leading edge strip. Install the hold-down block, the landing gear blocks, plywood reinforcement, and the dihedral braces. Prepare a long sanding strip by contact cementing sandpaper to a strip of pine or bass, and contour the nose of the ribs to meet the 1/8" strip.

Build the outer panels in the same manner. The ribs between the center rib and the end rib are rough-cut over-size. When you use the long sanding strip to form the taper, you'll end up with an accurately contoured framework that will receive the sheet covering uniformly. Join the panels to the center section and install the aileron linkage, pushrod, and the Nyrods. Sheet the wing with 3/32" stock, install the shaped leading edge and wing tips, then sand smooth.

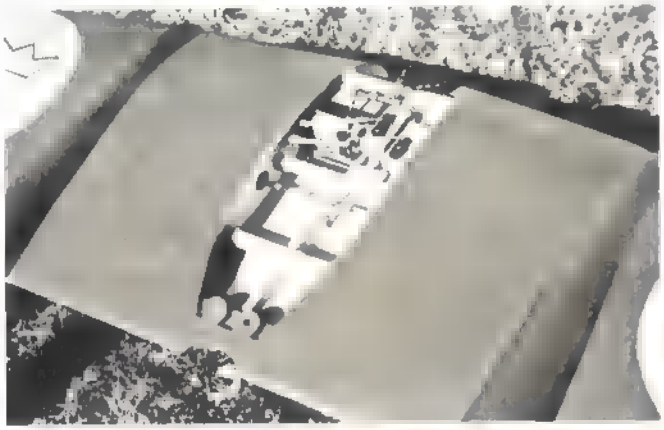
The booms are made from medium-soft stock and shaped as shown. After sanding, trace an outline of the rib at the dihedral joint onto the booms, and cut out. Cut down through the top of each boom to the trailing edge point and remove this section. Now lay a piece of sandpaper face up on the bottom of the wing and slide the booms back and forth until they match the wing. Draw a centerline on the top and bottom of each boom.



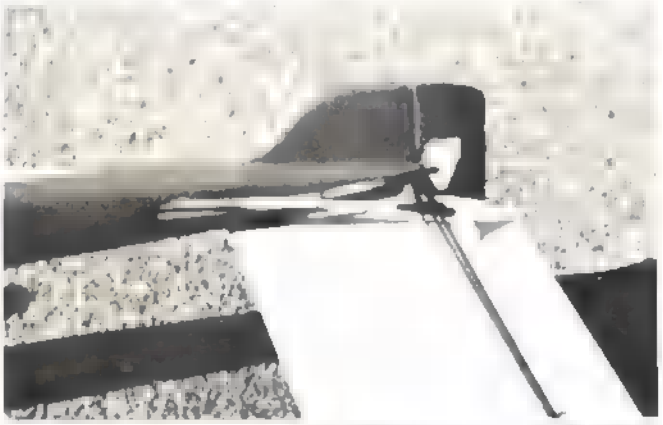
The fuselage "pod" houses the engine, tank, receiver, batteries and throttle servo. There is plenty of room for all components.



The Nyrod runs for the elevator and rudder curve through the wing, and then through the left boom.



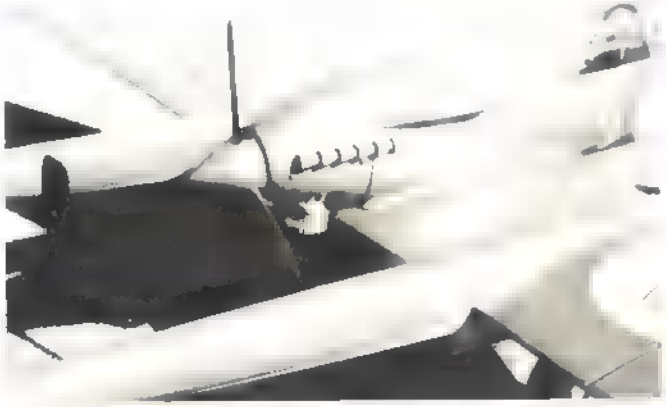
The rudder and elevator servos mount upright, while the aileron servo lays on its side, with the aileron connector passing beneath the servo mounting rail.



The rudder crossbar runs under the stab (the model is on its back in the photo). Both elevator and rudder connections are on the same side.

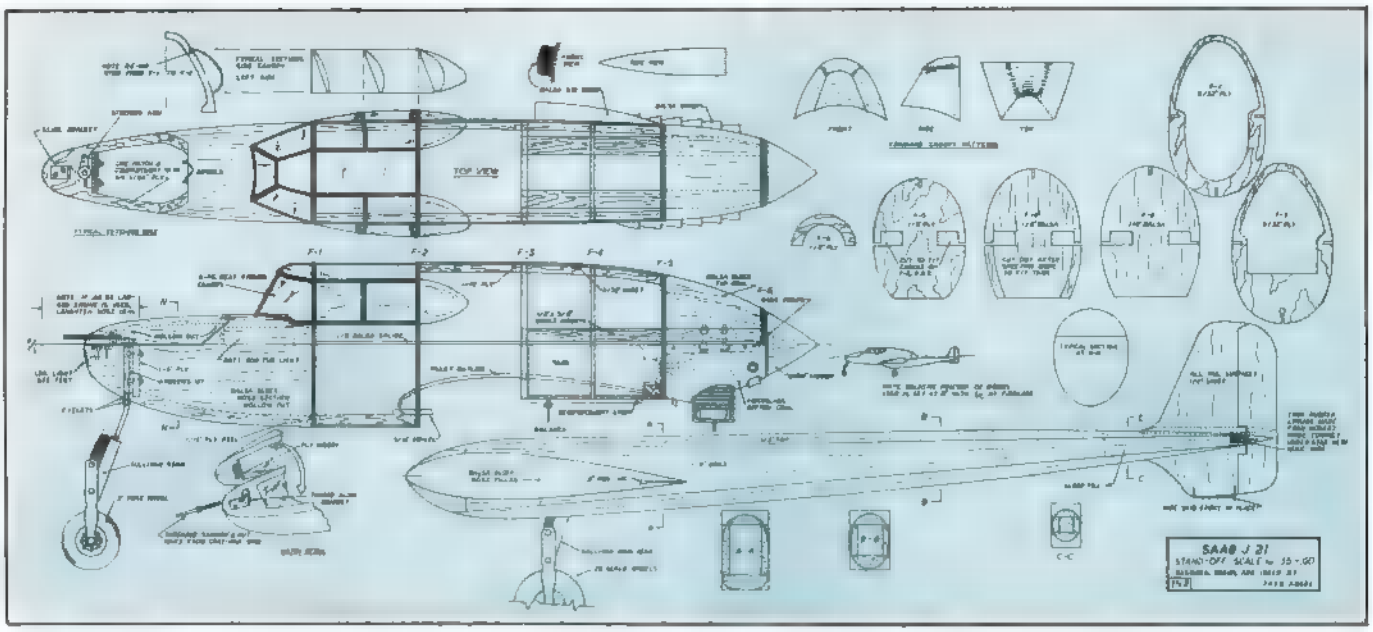
The Sullivan scale landing gear are rugged, yet easy to install. They are operational, and give that final touch of scale-like realism.

The access hatch to the battery compartment is molded from fiberglass.



The pusher installation is just the same as any standard tractor mount. There are many advantages of having the prop in the rear.

For the eye trained in viewing models with props on the nose, the Saab offers a pleasant change of pace.



Anchor the wing down to a flat surface, bottom up, and shim until the center section is level. Now align the booms evenly. Pin a temporary crosspiece to the tail end of the booms. When this piece is level with the center section, and the centerlines are parallel, glue the booms to the wing, first sliding the Nyrods through the left boom, or if you prefer, one on each side. Next, re-glue the forward top section of the booms.

While your assembly is aligned on the bench, make a pair of fins and glue in place. Save the end cones of the booms, which will be split and glued to the rudders.

The stabilizer is a flat sheet of 1/4" stock, with a shaped piece for the elevator. Round the edge and sand smooth, but do not glue in place just yet.

The next step requires patience, but it is most important. Make a cradle to support the fuselage. Use the motor mounts for one resting place and the nose wheel hole for another. Level the body fore and aft with the center splines as reference, and the motor mounts leveled the other way. Make a template of the top of the center rib using the outline marked "Typical Section" on the plan.

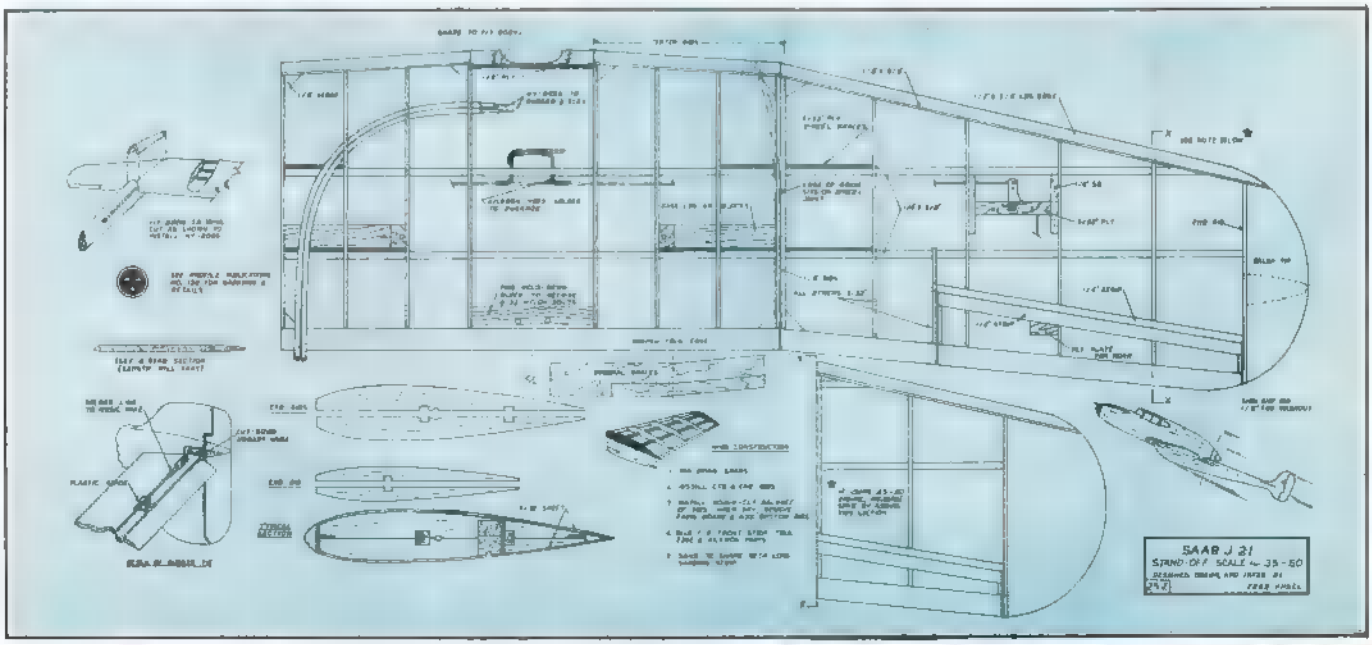
Position the template on the fuselage so that the front of the ply plate rests on the back side of former F-2. The forward spar will be behind former F-3, and the trailing edge will probably touch the engine head. This will be trimmed to fit on final installation. Use a protractor or multi-level and position the template so that there is about 2° positive incidence. Trace the outline and repeat on the opposite side.

Then cut out the fuselage to accept the wing. Place the wing on the body, and scribe the fuse side outline at the contact point. Cut out the top of the wing along this mark, to give access to the center section for servo mounting. After mating wing to the body, drill and insert the front wing dowel, and drill and tap the rear hold-down section. Bolt the wing in place and re-check leveling and alignment. Now go ahead and install the stab at 0° in relation to the body and level with the wing center. Note that the edges of the stab are square with the fins. For security, when you glue in place, push a couple of pins through the rudder into the stab. Push the heads in and fill the holes. Make fillets, where required, and give the model one last sanding.

The next step is finishing. The wing and tail surfaces were covered with silkspan; body and booms with Sitron. After clear doping, colors were mixed using Aero Gloss dope. "Sticky" Mono-Kote was used to make masking templates for spraying the insignia trim. Attach the air scoop and engine stacks before final color application.

After finishing, install the canopy pieces using "goo" or your favorite technique. Strips of heavy bond paper were sprayed with color and the backs were sprayed with contact cement.

(Continued on page 84)



FULL-SIZE PLANS AVAILABLE—SEE PAGE 86

The Unlimiteds Are Here

This 1/8 scale demon turns a quarter mile in under six seconds!

by Paul Richardson

Man has always taken his ideas to their maximum extension. The super plane, the ultimate pogo stick, the maximum ultimate end-all everything is only a logical extension of the creative process. So too, with 1/8 scale cars... project maximum power and you come up with a Webra 61 powered 'Vette.

By the time one gets from the armchair to the workshop, such grandiose thoughts settle into practicality. The smell of burning slicks is lost in the musty corner where an unused three channel rig is gathering dust. Sleek mental lines become jutting angles of brass tubing laid out on the workbench. A cup of coffee rekindles enthusiasm, and problems become questions. A second cup of coffee shows the pattern, and a few lines are scrawled on paper.

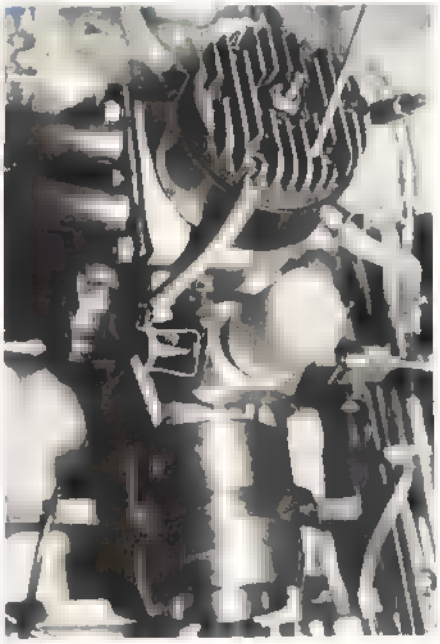
The first problem I ran into was the frame structure. I knew it would have to be made very strong for the purpose I had in mind. After much experimenting, I settled for square brass tubing. By taking a piece of 1/4" square brass tubing and then inserting the next two sizes smaller brass inside it, I found it to be quite strong. Then I laminated a piece of 3/16" brass to the 1/4" brass and soldered them together. By doing this I came up with the frame I wanted, and with the strength required. After I soldered the frame and cross braces together, I then bolted the joints, using four 40 aircraft bolts.

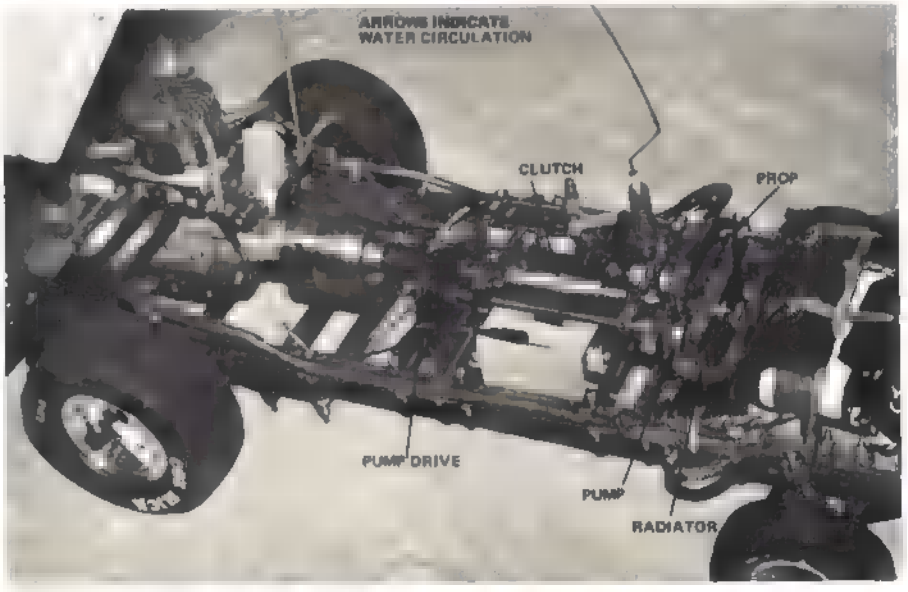
The next problem I encountered was a suitable clutch. The clutch I needed would have to stand up to 60 size engines. I tried all kinds of ideas—some would work for a while, then burn out. Then one day while we were having a cookout, I decided to run the car for my father-in-law, Bob Shannon. As usual, the clutch burned out after the first run, but I had interested Bob, who works for a machine shop. We improved the design by increasing the amount of surface sweep, and, after much experimenting, came up with adjustable bands. The bands can be adjusted from 3,000 to 8,000 rpms for engagement. The original clutch is still being used to transfer the power of the 61 Webra marine engine to the rear wheels. The last time I had it apart, it showed no signs of wear.

Again, with the help of Bob Shannon, I designed the drive assembly. It consists of three 3/16" stainless steel shafts, running through oilite bearings. The first shaft is coupled to the engine with the use of a universal joint. This shaft runs through two oilite bearings to the clutch. The second shaft runs from the clutch, through two more oilites, to the primary reduction gears. The third shaft runs from the reduction gears to the rear axle gears. The axle shaft is 1/4" steel.

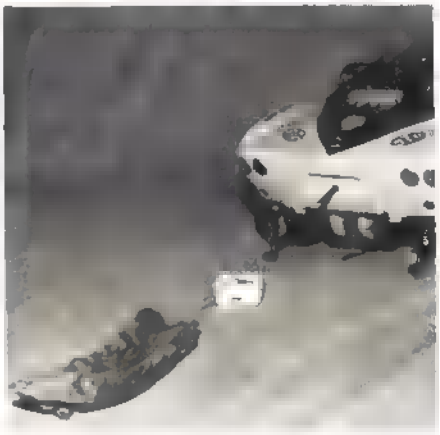
To make a heat sink large enough to dissipate the heat generated by the engine would make it too large to fit in the car. I used a micro pump driven by the engine with the use of two pulleys and an O-ring drive belt. The coolant is circulated from a coolant tank mounted behind the engine to the radiator. The radiator is made of round brass tubing, with fins soldered to the vertical tubes

(Continued on page 110)

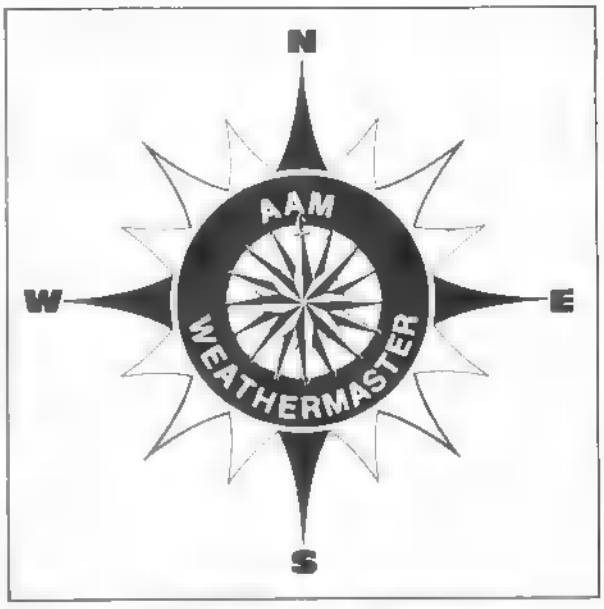




TOP LEFT: Richardson's 'Vette wheelies with ease at the snap of the Webra 61's throttle. TOP RIGHT: The Webra Blackhead Marine runs cool due to a complete water cooling system. BOTTOM RIGHT: The chute, salvaged from a Cox dragster, works off the opposite throw on the brake servo.



Photos by Author



AAM Weathermaster

THE CONCLUSION OF OUR THREE-PART SERIES, DESIGNED TO MAKE YOU AN ACCURATE WEATHERMAN.

by Hobie Steele

If you have completed all the rooftop goodies described in last month's article, you're ready to get to the indoor monitoring station for wind direction and airspeed. Recall that the wind vane/generator assembly snaps in and out of its stationary mounting bracket/wiper. It wasn't suggested that you snap the weather vane into the roof bracket last month. If you did, get out the ladder and carefully remove the rotating vane from its perch.

For the indoor monitoring station, a 0-1 scale milliampmeter is needed. I used a 0-1 meter with the "Red Baron" motor (generator), and a 0-500 mil with the higher output Aristo-Craft motor. You'll also need ■ 0-1K ohm (or less) variable resistor, a house current (115 V, 60 cycle) supplied 6-24 volt AC transformer, a lamp cord and plug, ■ momentary-on (spring loaded off) 115 V line switch, a clock hand, and ■ case in which to mount the whole business.

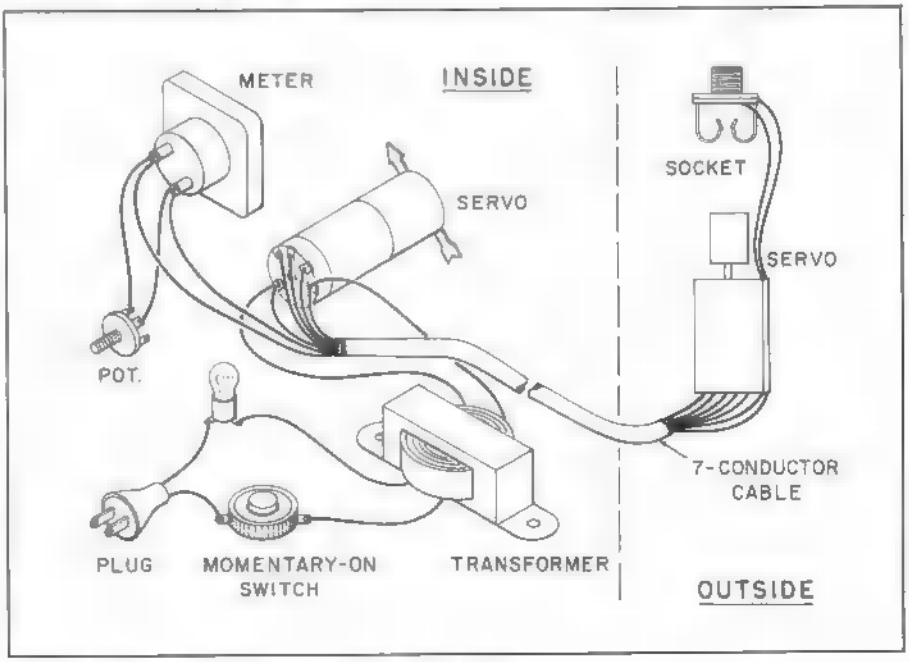
I built two different units, one encased in a discarded "exit" sign, and another in ■ smaller metal case from Ace R/C (Higginsville, Mo.). The large case houses a slave servo for wind direction, a 0-1 milliampmeter for wind velocity, a barometer, and an additional meter for a future project. The Ace case contains only an enormous 0-500 milliampmeter (0-1/2 amp) and the wind direction servo. No barometer was used in this one, since is was mounted near an existing wall barometer. Buy the largest face milliampmeter you can find for $5.00. A meter with ■ 270° scale would be great, if you can find one. You can get appropriate meters at economical prices from places like Radio Shack or surplus outfits.

Unless the cable from the roof unit into your house is considerably longer than 50 feet, its resistance is negligible in calibrating the meter. Calibration can best be done at your nearest NOAA weather station, but I calibrated mine in an automobile. Ideally, the weather vane/generator should be mounted on a bracket in front of the car to minimize extraneous airflow from the car itself. Pick a perfectly calm day, or else average each calibration run upwind and downwind. A perfectly calm day would ■ by far the best. If you use your car, it's suggested that calibration be done early on a Sunday morning. You can't imagine how foolish one feels, trying to go ten miles an hour during rush hour in a convertible, with the top down, and some fool standing up in the back seat with an ugly model airplane's prop whirling in the breeze, shouting "Hold 'er steady!"

Clip a temporary lead from each contact of the plug on the wind vane to the terminals of the meter you intend to use. Place a pot (variable resistor) as a shunt across the meter leads, if you are using 0-1 ma meter. If you are using ■ 0-500 meter, place the pot in series with one of the leads, since the meter will probably have an internal shunt already. Any linear taper, low value (1K or less) pot may be used. Blow on the prop to determine its direction of rotation and spin it smartly in that direction by hand. . .the meter should register. If not, reverse the leads to the meter.

Now drive at a steady 20 mph, with the prop in unturbulated air away from the car. Unfortunately, the calibration of every instrument will vary according to the DC motor used as a generator, the range of the variable resister, and compliance of the milliampmeter. Adjust the pot to read "2" on the meter's scale, i.e., 20 mph.

Now try 30 mph. If your meter indicates "3," thank your lucky stars, because linear output of ■ rig like this is more luck than skill. Remember, if you run into some calibration problems (*like running out of gas, or doing 30 mph in a 35 mph zone—php*) the system works great and it's cheap! Run your speed up to fifty or sixty miles an hour, and see if the meter "pegs." If it reads at the very top of its scale, you'll need to adjust the pot to keep it in bounds, but changing the pot setting at any given speed will throw earlier readings off. Since we're concerned with model flying, I didn't



METER READING	WINDSPEED M. P. H.
	5
	10
	15
	20
	25
	30
	35
	40
	45
	50
	LOOK OUT!

worry about measuring really high wind velocity. Accuracy at lower speeds—say, 10-25 mph or so—is more important for our purposes. When you're satisfied with the pot setting, glue its shaft permanently to the pot body.

Each of my meter/generator setups registered quite differently. I adjusted the pot on the 0-500 milliampmeter so that 50 mils = 10 mph, 100 mils = 20 mph, 150 mils = 25 mph, and so forth. The 0-1 milliampmeter worked out to 1 mil = 15 mph, 2 mils = 20 mph, 3 mils = 25 mph, etc.

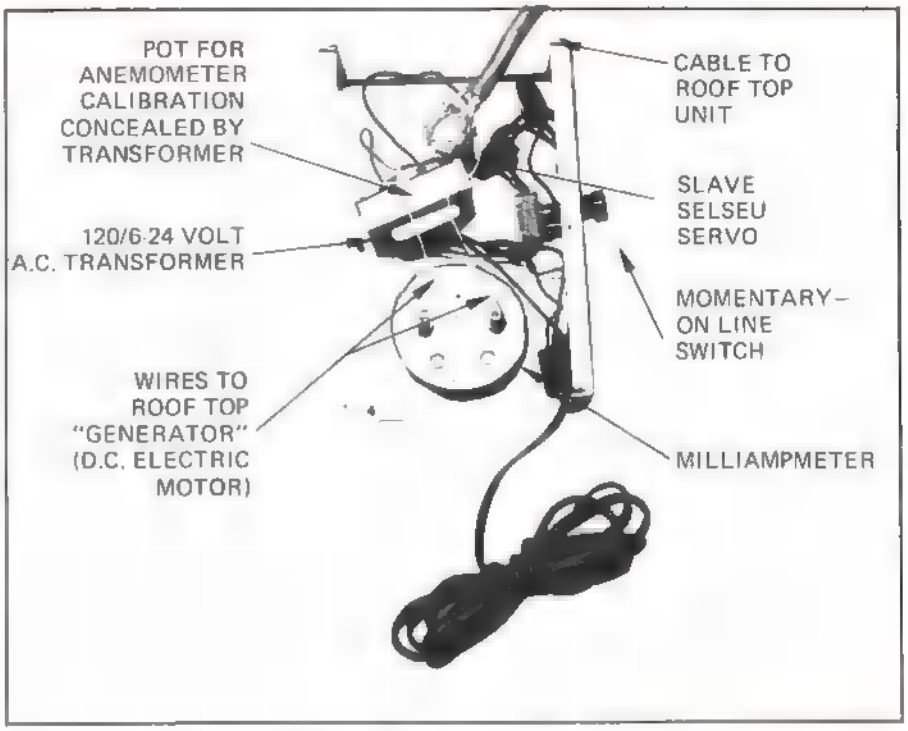
There are two ways of "reading" wind velocity from meter indications. If you're super neat, you can remove the face plate from your meter, turn it over and number the appropriate wind velocity figures on the back side. The back then becomes the front, and velocity may be read directly from your meter face. Numbering can be done with a Leroy lettering set or with pressure sensitive numerals. The other method is to use a conversion table pasted to the side of the monitor's case. I'm super messy, so this is the method I used. We have included a blank, which you may use for your own conversion table, by simply entering your appropriate meter reading beside the velocity figures.

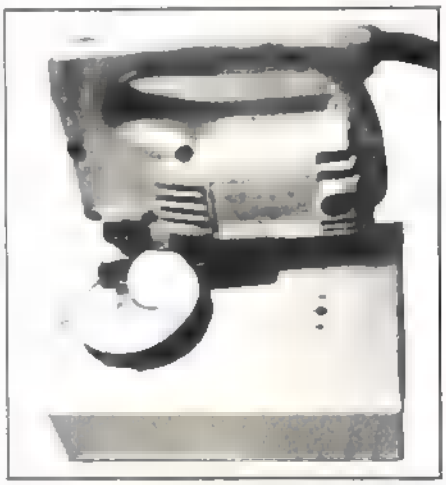
Now let's get all the stuff in a suitable case. For my "exit" sign housing, I cut a piece of 1/4" plywood to fit the case, and laid out my switch, wind rose (compass points), barometer, and meter openings. Then I cut the holes with a saber saw, drilled one hole for the slave selsen servo's shaft and two holes for mounting screws. At this point, decide where to mount the transformer. I used a transformer from a slotcar outfit (without a DC rectifier), then drilled mounting holes for this. I varnished the mounting board, and pin-striped it in gold to dress it up a bit.

The metal [illegible] from Ace R/C was similarly cut out and drilled. It should be ample enough for the wind rose, anemometer meter, and a small barometer like the one pictured in the "exit" sign case. If you're a "wood butcher," you could display your cabinetwork with a fine hardwood case. Should you choose to [illegible] a metal case, prime it with zinc chromate primer (aerosol) and paint it to harmonize with the room in which it will be located. Mine is in the workshop, so I have "harmonized" it by splashing 20 different colors of dope on it, adding some glue blobs, a few solder splatters, and an AMA decal—crooked! Actually, I gold enameled it.

Cut out the wind rose provided, and glue it to the front of the case, so that

(Continued on page 84)





ABOVE: Cut out a hole for the milliampmeter in a metal case (this one from Ace R/C). Three small holes are for slave servo, to indicate wind direction. BELOW: Two completed wind direction and velocity monitoring units. Larger unit houses a barometer, as well as an additional meter for a future project. This case is a discarded "exit" sign box.

ABCs of Fiberglass

by Robert Harrah

This method of fiberglassing is ■ simple as ABC, and avoids complicated techniques, exotic materials, and hard-to-get items. Every effort has been made to minimize the problems often encountered in working with glass. The techniques illustrated here are successfully employed in industry. I have purposely avoided exotic gel coats, and special waxes and release agents, which are far oversold.

The only item which may prove difficult to purchase is the PVA (polyvinyl alcohol of the water-base type). Many manufacturers do not use PVA as a release agent, but use silicone-based agents instead. Since most of the items which we mold are to be painted, the silicone release agents must be avoided.

If this will be your first venture in fiberglassing, it is recommended that all of the illustrated steps be carried out with ■ sample piece of wood. This will give you an opportunity to familiarize yourself with the procedures without ruining a valuable part of your aircraft.

I have intentionally chosen this cowl to show that large pieces, with complex curves, can be easily worked. The key factors in making a good mold are no undercuts (reverse curves) and ■ good draft (taper) in all directions, to permit an easy release of the plug and final part. Normally, I would have done this cowl in two halves, and then joined them. For the sake of this article, however, I carried the project through as ■ one-piece structure. The technique of matched halves can be utilized for fuselages, floats, or any larger assemblies.

Glass mat is used in this application, because it is easy to work, inexpensive and lightweight. The lightweight glass found in hobby shops is a little more difficult to form around curves. There aresoft and stiff mat materials available. The soft variety is preferred for this type of work.

When shopping for resins, select one that allows ■ working time of 15-20 minutes. The use of resins is a very exacting science. Follow the manufacturer's instructions to the letter, especially on the amount of catalyst to use. It is true that extra catalyst will give quicker curing, but this can often result in excess heat, which will crack and craze the surface. The thicker the coat of resin applied, the less catalyst required. Sometimes, on the initial light gel coat, it may be necessary to increase the amount of catalyst. Such instructions usually accompany the product.

When mixing ■ batch of resin, a good rule of thumb is to prepare 1½ times as much resin as the weight of the cloth or mat. Remember that the strength of the finished part comes from the glass fibers, not the resin. Excess resin will only add weight. Applying the resin requires some practice (again, do a run through with ■ sample project). The simplest applicator is an inexpensive, stiff bristle brush. The glass mat, when first applied, will seem stiff and unmanageable. However, in ■ matter of moments, the styrenes in the resin will melt the binder in the mat and it will flow easily to shape.

It is a good idea to have a clock handy, so that you can time the setting of the resin. If you are working a 15 minute mix, then be sure to stop at 13-14 minutes, so that you have ■ few moments to do ■ final touch up, as well as to get those brushes into a cleaning solution. Some manufacturers recommend lacquer thinners for cleaning up. The most popular thinner is acetone. Should you be allergic to either of these, MEK (methyl ethyl ketone) can be used. MEK works well for cleaning up epoxies and dopes.

One other precaution: Avoid breathing the volatile vapors of the resin. An inexpensive face mask is recommended. Also, use the face mask when sanding the fiberglass, to avoid respiratory problems. Resins are flammable, and should be handled properly.

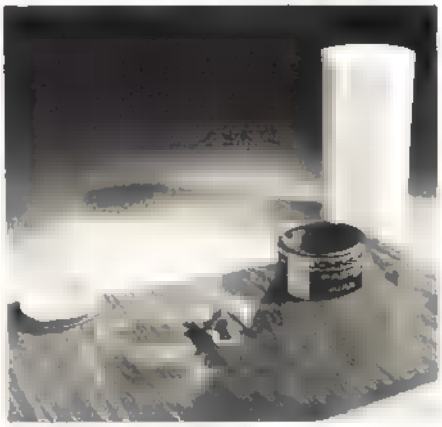
The methods outlined in the accompanying photo sequence are well-proven and work reliably. With a little practice, you can fabricate (or duplicate) wing tips, cheek cowls, nose cowls, wheel pants and other attractive accessories for your models.

(Construction photos on following two pages)

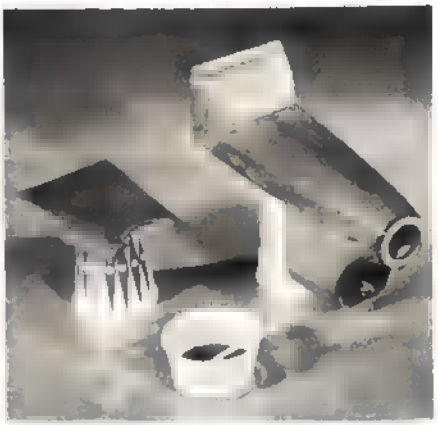
MATERIALS

Formica work surface
polyethelene container (for clean up)
resin pigment or dye
inexpensive paint brushes
stirring sticks
PVA (polyvinyl alcohol)
acetone (or substitute thinner)
catalyst
sanding resin
surfacing resin
paste wax
paper towels
assorted sandpapers
paper mixing cups (unwaxed)
glaze and spot putty
spray can of acrylic lacquer primer

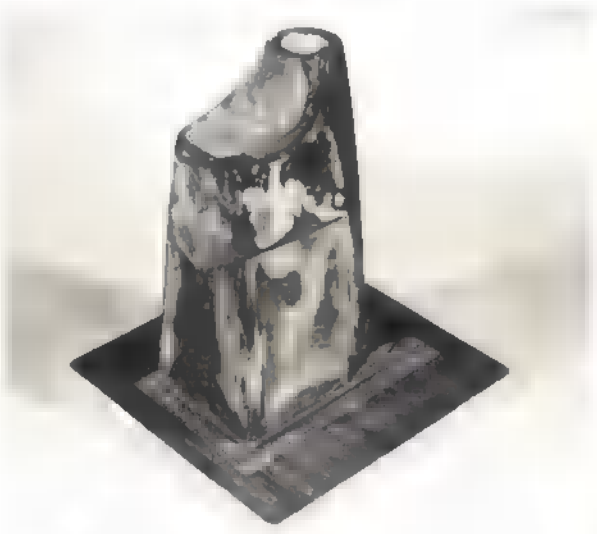
1 After gathering all the supplies on the Materials list, the fabrication of fiberglass aircraft parts, such as the hatch and cowl on this Midwest Skysquire, is as easy as ABC.



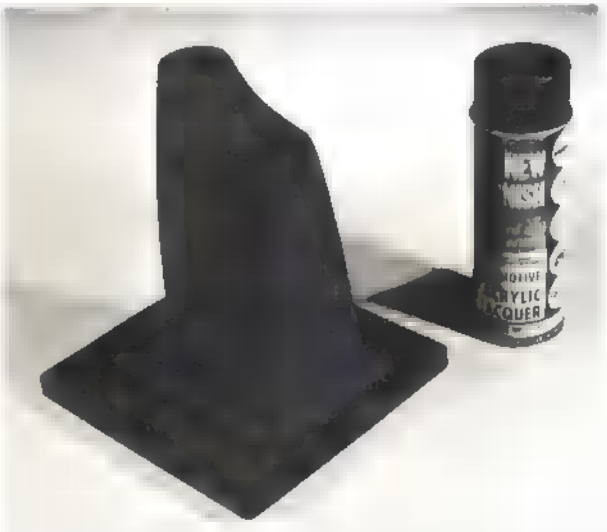
2 Give the Formica work surface five to six coats of a paste wax, like Johnsons. This prevents adhesion of the resin.



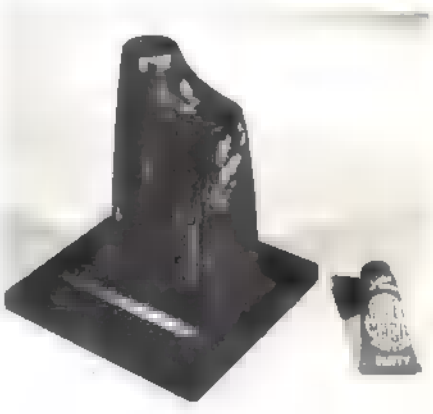
3 The parts to be duplicated are given a liberal coat of surfacing resin, then sanded smooth.



4 Because two adjacent parts are being molded, they have been glued together. All voids — holes (air scoop, engine holes, etc.) have been filled with scrap balsa and a thick mixture of resin putty. Resin fillers are available commercially. Secure the plug to a firm base, then work it to its final shape. At this stage, what you see is what you get.

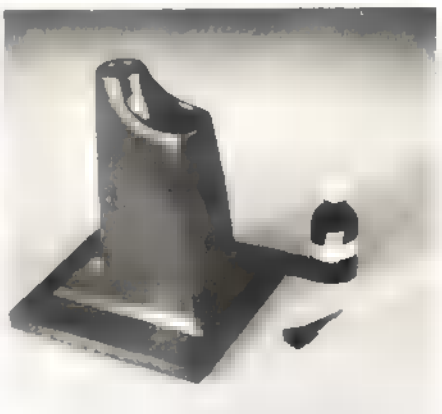


5 Spray two coats of acrylic lacquer primer. The grey or black types seem to work best. Sand down the primer to a smooth surface.



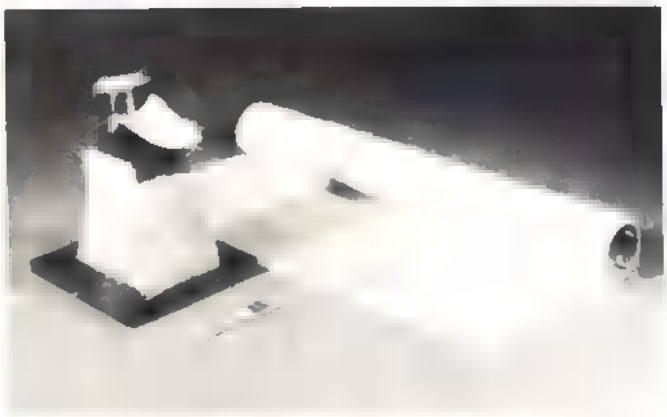
6 Fill all small holes and flaws with glaze and spot putty. A contrasting color of putty simplifies this step.

7 After two more coats of primer, and a light sanding with 600 paper, the object gets six coats of rubbed paste wax for beauty. Work the last two coats of wax with 4/0 steel wool. This is the final male plug, so make sure it's perfect.

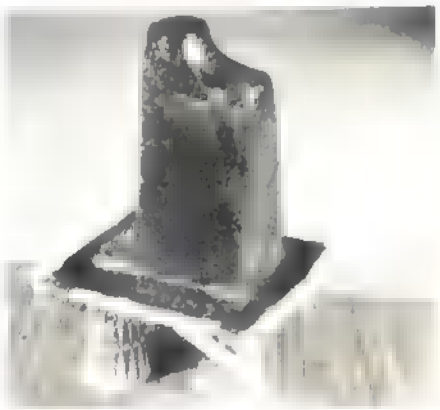


8 Either spray or smoothly brush on a coat of PVA. Get complete coverage, and let dry thoroughly. If the PVA needs touching up, wash it all off and start again.

9 Apply a very thin coat of surfacing resin, which has been pigmented to aid visibility. Uneven application, especially in corners and on edges, will cause uneven shrinkage as the resin cures. The pigment will allow you to detect any unwanted air bubbles.



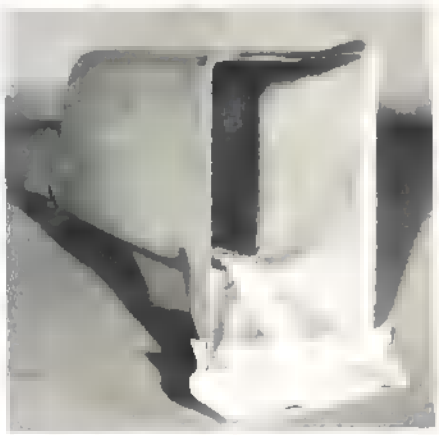
10 Mat comes double-layered on the roll. For small parts, separate the layers. Cut the mat into small, workable pieces. Brush a very thin layer of resin onto the mold. Use the tackiness of this coat to hold the mat in place. Then dab (don't brush) the resin into the mat.



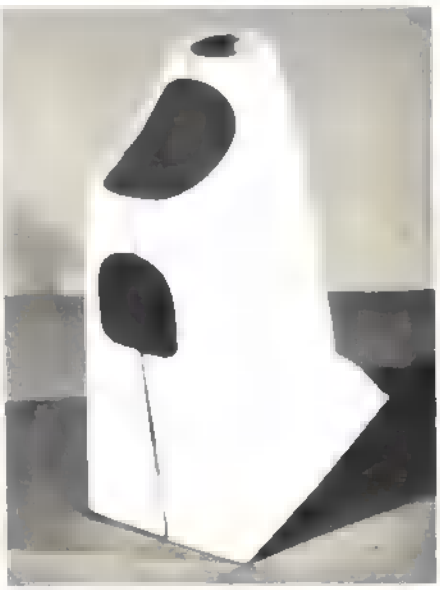
11 After applying four layers of mat, the mold should be approximately 1/8" thick. It must be rigid enough not to distort, ■ larger parts may have to ■ thicker. The moment of truth is then at hand. If done properly, the mold will pop loose when a few wedges are pried under the edges. To assist a stubborn case, a little water poured into the cracks along the edges will soften the PVA.

12 Trim the edges of this female mold, leaving a 1/8" flange for trimming any excess on the completed part. Cut the mold cleanly in half. Inspect the inside carefully, and touch up any pin holes.

13 Now repeat the waxing and PVA application (steps 8-9). Then lay up several layers of mat, ■ described previously, until the desired thickness is achieved. The edges of the mat should be trimmed flush with the mold by drawing a sharp knife at 45° to the edge, while the resin ■ still "green," or not fully cured.



14 Join the halves with masking tape on the outside. Use 1/2" strips of mat, dabbed into place, to secure the halves. Any areas of stress, ■ places where mounting screws will be located, should receive an extra piece of mat for reinforcement.



15 Wet sand ■ final product with 600 paper to remove all the PVA. Fill minor imperfections, make all the necessary cut outs, and paint.

16 The completed cowl can ■ either used as is, or cut into the subassembiles from which it was originally formed.

NEW PRODUCTS CHECKLIST

ERIC W. MEYERS

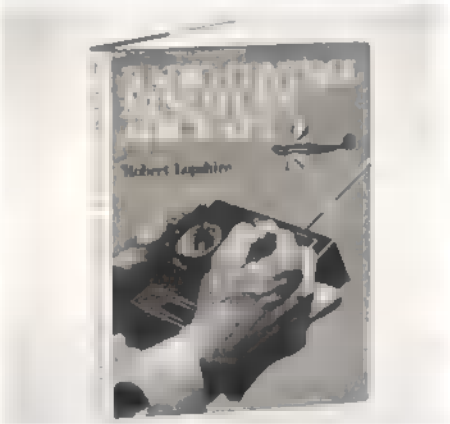
Models West/Two Bits. Those starting in quarter midget might look into this ship ■ ■ possible training airplane, as it is designed for 15-size engines with either front or rear rotors. Kit features a preassembled fuselage, and the wing has no dihedral, making this a very fast kit to build. All balsa parts are machined, not die-cut. Landing gear can be easily converted to form either a trike gear or taildragger configuration. Wingspan is 38", with 342" sq. of area. $26.95. Models West, Inc., P.O. Box 2257, Phoenix, Ariz. 85002.

West Coast/Red Tak. New contact cement offers positive bonding qualities and easy brush application. The liquid contains a color additive ■ that you can brush on ■ even coat of cement. Designed primarily for foam cores and balsa sheeting, the material sets up in approximately 10-15 minutes for quick building. $2.50 per pint. West Coast R/C Products, 12084 Woodside Ave., Lakeside, Calif. 90240.

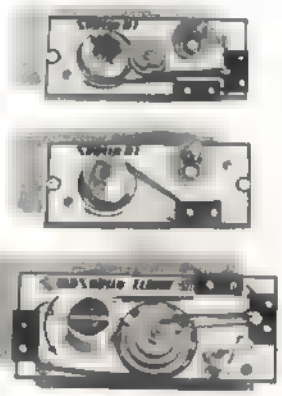
D&B/Polyurethane. New final finish for any scale or sport airplane is this polyurethane, which seals decals and paint so that the finish is impervious to even high nitro fuels. Since the liquid goes on very thin, one can is enough for three large 60-size airplanes. Very little weight is added to the finish. Two types available: ultra gloss and matte finish. Price is $3.95 per pint. D&B Models, 31 College Lane, Dartmouth, Mass. 92747.

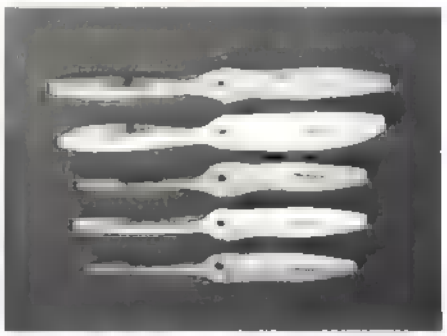
Windspiel/Polish Cobra. Full 1/6th scale Polish F2D-36 Cobra 17 glider has a wingspan of 121" with 717" sq. of area. This attractive ship is almost full scale, and the kit has ■ white gelkote glass fuse, and ■ balsa and spruce wing and stab. Parts are machine-cut for accuracy and good fit. Hardware is included. A two-channel design. $74.50. Windspiel Models, 3704 Montgomery Dr., Santa Rosa, Calif. 95405.

Ace/72 MHz Flite Pak. Economy minded modelers should know that Ace is now offering ■ 1-8 flite pak on 72 MHz for those who already have a modern digital transmitter. The system is in kit form, and ■■■ IC servo amplifiers and O&R mechanics. Price ranges from $74.95 with two servos, to $116.95 with four servos, and $5.00 is added for the 72 MHz. Ace R/C, Inc., Box 301, Higginsville, Mo. 64037.



MacMillan/Radio Control Aircraft Book. This book written by ■■■ Lopshire is undoubtedly one of the best books ever published as a basic beginner's guide to terminology, rules, and basic concepts of R/C. The book covers getting started, airplanes, power plants, adhesives, construction, techniques, covering, installation, maintenance and many other topics in a detailed fashion. Illustrated with 96 photographs and 40 line drawings, the book ■ comprehensive and clearly written, easily understood by even the most novice R/C enthusiasts. Books sells for $8.95 in cloth, $4.95 in paperback. MacMillan Publishing Co., Inc., 866 3rd Ave., New York, N.Y. 10022.





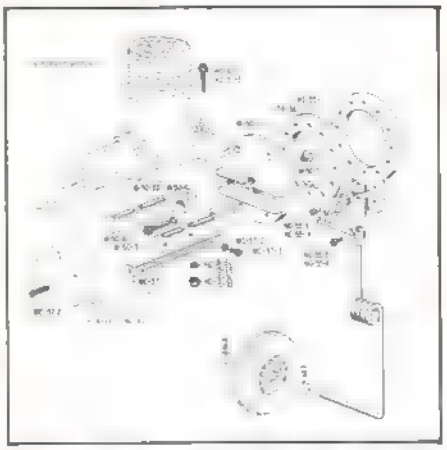
Aero Models/Timers and Props. Aero Models is a source of the incomparable Seelig timers, available in three different models with either one, three or four functions, selling for $13.50, $16.90 and $19.90 respectively. These timers are claimed to be the most accurate in the world; great for the competition free flight modeler. The props shown are Bartels unfinished fiberglass and epoxy. Sizes range from 5¾" up to 11", and these props sell for between $2.99 and $5.99 each. Aero Models Supplies, P.O. Box 245, Culver City, Calif. 90230.

Wilhold Glues/"Glu-Bird" White Glue. This improved all-purpose adhesive is adaptable for bonding many materials such as wood, cardboard, hardboard and other porous materials. The glue contains no adulterants or fillers that can soften or weaken the glue joint, so the glue is actually stronger than the wood itself. Joint dires clear and can be sanded without clogging sandpaper. Clean up made with damp cloth. Available in one-quarter oz., 2/17 oz. plastic squeeze bottles. Wilhold Glues, Inc., 8707 Miller Grove Ave., Santa Fe Springs, Calif. 90670.

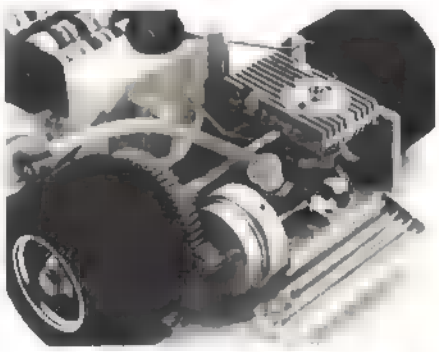
Crocket Replicas/Winding Hooks. Shown are three of many new accessories designed for the free flight modeler. These hooks are designed so that the intensity of the power burst and time of the motor run can be varied by winding through either the short or longer shank. Hooks are available for all different sizes of models, Peanut Scale through Unlimited. Motors can be wound in a safety tube with propeller detached. Aluminum castings have ■ special hard polish finish. Price ranges from between $1.00 to $1.95, depending on size and style. Jim Crocket Replicas, 1442 N. Fruit Ave., Fresno, Calif. 93728.

Du-Bro/Shark. Throughout the flying season, this R/C helicopter has proven to be one of the best flying helicopters available. Construction features easy bolt-together assembly. Kit comes complete with an O&R 1.3 cu. in. engine, gear box, clutch, all ready to bolt into the frame. Flying weight is about 14 pounds. Forward speed is approximately 70 mph. Four-channel radio set is needed for control. Price is $350.00. Du-Bro Products, Inc., 480 Bonner Road, Wauconda, Ill. 60084.

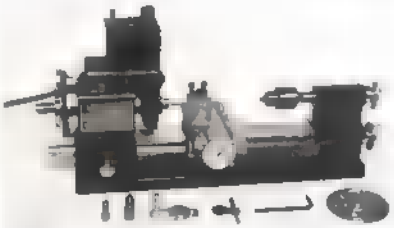
Bob Holman/Expo ■ Large scale high wing, semi-scale cabin ship has a strong resemblance to the Aeronca Champ, with a touch of the Piper Cub. This four-channel beast has ■ wingspan of 80" with almost 1,000" sq. of area. All balsa construction is surprisingly straightforward, simple and light. All-up weight is 7½ to 8½ pounds, for 49-74 size engines. Kit includes all balsa and ply, hardware, wheels, ABS pants, and fuel tank. $64.95. Bob Holman Plans, P.O. Box 741, San Bernardino, Calif. 92402.



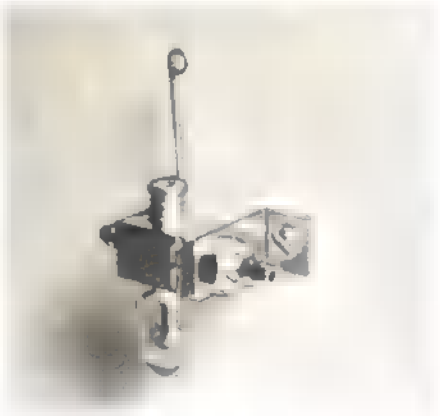
Edson/Motor Mount System. Now, in addition to their adjustable motor mounts, Edson has an adjustable nose gear unit, a cowl mounting bracket assembly, and ■ thrust ring for providing either right ■ down thrust, as designed for that aircraft. The nose gear unit fits against the firewall, and comes with all hardware. Cowl mounting bracket allows quick removal of a nose cowl, and gives added support to reduce vibration. The motor mount assembly sells for $11.95. The nose gear assembly, $3.95; mounting bracket, $1.98; thrust ring is $.79. Another set of unique products from Edson Enterprises, Inc., 381 Franklin Ave., Belleville, N.J. 07109.



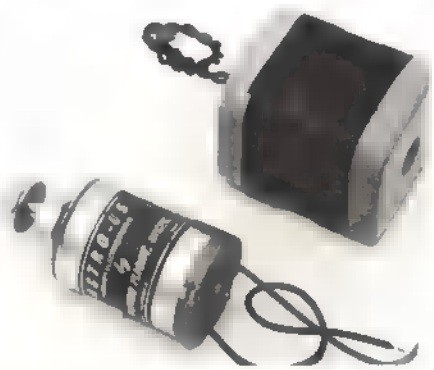
JoMac/Tee Dee Engine. Want to make your existing Jerobee Car really move? Try this Tee Dee 049 with ■ special left hand crankshaft and throttle sleeve. The engine comes complete with set screw anchored aluminum flywheel and clutch assembly, and sells for $24.95. The motor mount is a special mount which acts as a heat sink and provides ■ very solid mounting in a standard Jerobee chassis. Mount sells for $6.95. JoMac Products, Inc., 12702 NE 124th Street, Kirkland, Wash. 98033.



Martin/Metal Working Lathe. Ever had an idea for a part, but just couldn't quite seem to make it out of balsa? This modestly priced three inch lathe is just the right size as it is easily stored, but large enough to meet all modeling needs. Basic unit incorporates adjustable Magneto, head stock ball bearings, calibrated hand wheels, two variable speed ranges, plus a 18I motor. Equipment which comes with the unit are the lathe, motor and speed controls, pulleys, belt, face plate and carrier, tool post, tool bed, and a three-core cord. Many accessories are available. Unit sells for $169.50. Martin Enterprises, Box 407, San Marcos, Calif. 92609.



Tatone/Fuel Shutoff Valve. Neat gadget for just about all forms of aircraft, cars, and boats, this shutoff valve has ■ spring loaded plunger which is released by ■ trip wire to stop the engine immediately. Unit is mounted by an adjustable mounting lug. Valve is machined from brass and weighs 3/4 oz. Price is $4.95. Tatone Products, 1209 Geneva Ave., San Francisco, Calif. 94112.



Astro Flight/Astro-05 Motor. Latest electric aircraft motor is the smallest of the line as it swings a 5½ x 4 Cox prop for best performance. Normal flight time for this motor is about five minutes, depending on size of aircraft and propeller. Special nickel cadmium batteries are included with the motor, and they can be recharged at the field in just 15 minutes from an auto cigarette lighter receptacle. Price is $34.95. Astro Flight, Inc., 13377 Beach Ave., Venice, Calif. 90291.

Sig/Kwik Bilt Minnow. Sig has developed ■ quarter midget pylon racer using their patented Kwik Bilt construction system, where the internal profile structure carries the load of the engine and flight surfaces, protecting the plastic fuselage shell. Wings are covered with plastic skins glued to a foam core to speed the wing completion, eliminating surface preparation. Kit includes plastic cowl and hardware pack. Wingspan is 39½ in. and weight is 3 to 3¼ pounds. Price is $24.95. Sig Manufacturing Co., 401 So. Front St., Montezuma, Iowa 50171.

Build Your Own G METER

by Bart Hayhurst

Did you ever wonder how many Gs your aircraft is pulling at any one time? You might be suprised. This meter will tell you (within 10%) your max G load during any one flight. Put a paper in the meter and take off, then do a dive and pull out sharply. Now do two or three loops, trying to keep them the same size, then land and remove the paper from the meter. With the calibrator laid over the line on the paper, read the highest G load (this is the dive pullout load). Along this line, the pencil will have chattered enough that you can read the load during the loops. After you have used the meter for several flights, you will learn where to expect each reading to occur and be able to pick out several spots made during a flight.

A word of warning: Since your model probably has only been flown as a sport or pattern type and not subjected to max G loads, let's give it a good looking over. Is the wing strong, are the pushrods such that they cannot bend?

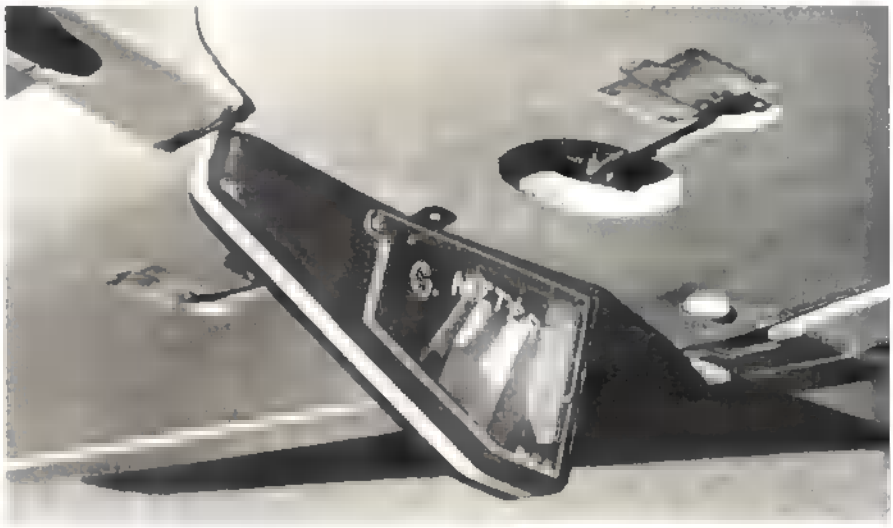
CONSTRUCTION

Cut the top block to fit the wing of your aircraft and shape, as per the plan. Now cut the hardwood nose block and drill for the 1/32" music wire. Glue this block in place. Solder a 3/8" nut to a length of 1/32" wire and drill the nut for a pencil lead. Make this a loose fit and wedge a splinter to hold the lead tightly in place. Put the 1/32" wire in the nose block and adjust it to the proper length. With the top block levelled in a vice, adjust the wire so that the nut sets just below the top block.

Place a paper behind the nut, so that it is stationary, and make a mark with the point of the lead. Make a hook, for calibrating, from 1/64" wire and hook it over the nut. Now place another nut of the same size on this hook and make another mark at the end of the lead. This is two Gs. Add one more nut and mark—this is three Gs—and so on until you have about 20 nuts on the hook, and 20 marks on the paper. From this paper make a calibrator, as shown on the plan, from 1/8" clear plastic. Scribe the plastic with a Moto-Tool.

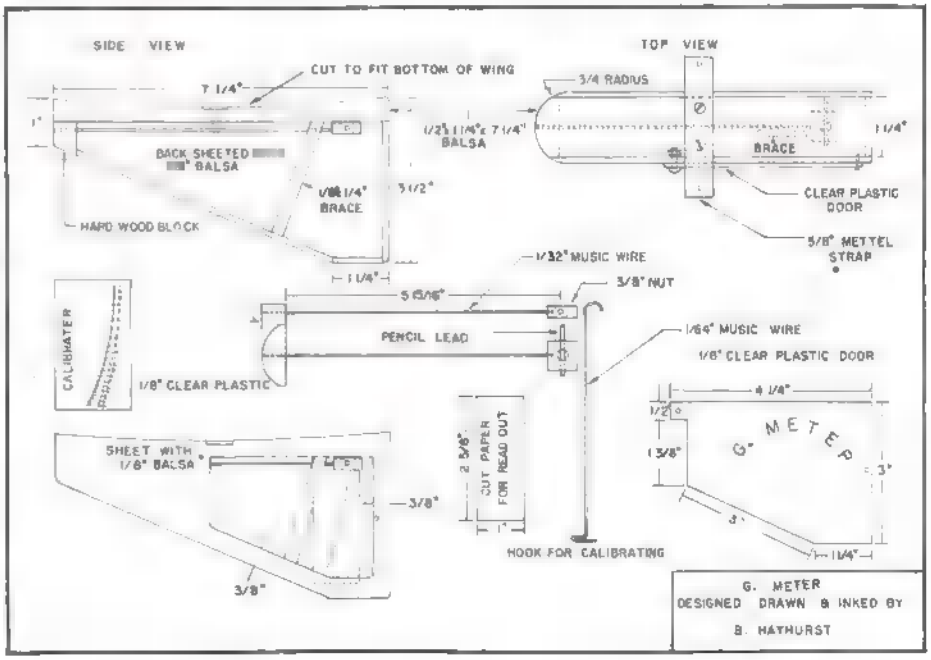
Build the rest of the box, as per the plan, and paint. Put a piece of double-faced masking tape in the back of the box where the paper will go and place a piece of paper on it. With the meter setting level, adjust the lead so that it barely touches the paper, and you are ready for the first test.

I think that you will find it a lot of fun and very interesting, not only to you but also the rest of the fliers in your club.



The G Meter, installed near the CG of a model, records flight loads by the forces applied to the flexible wire torque arm. The more Gs, the greater the deflection of the weighted arm.

The calibrator is a scale which reads multiples of the original weight of the arm. The scribe marks on the paper are compared to the calibrator to give interpretive readings.



Let your imagination fly

With a Dremel Moto-Tool Kit, your ideas take off. Over 30 accessories sand, drill, cut, carve, shape, polish and more!

Moto-Tool lets you build planes faster, easier, better! Up to 30,000 RPM put you in command of almost any modeling job.

So let your imagination fly with a Dremel Moto-Tool Kit. See your hobby or hardware dealer today!

DREMEL®

DIVISION EMERSON ELECTRIC CO.

creative power tools

Dept. 684H, Racine, Wisconsin 53406

SIG

Radio Controlled MODEL AIRPLANE RACES

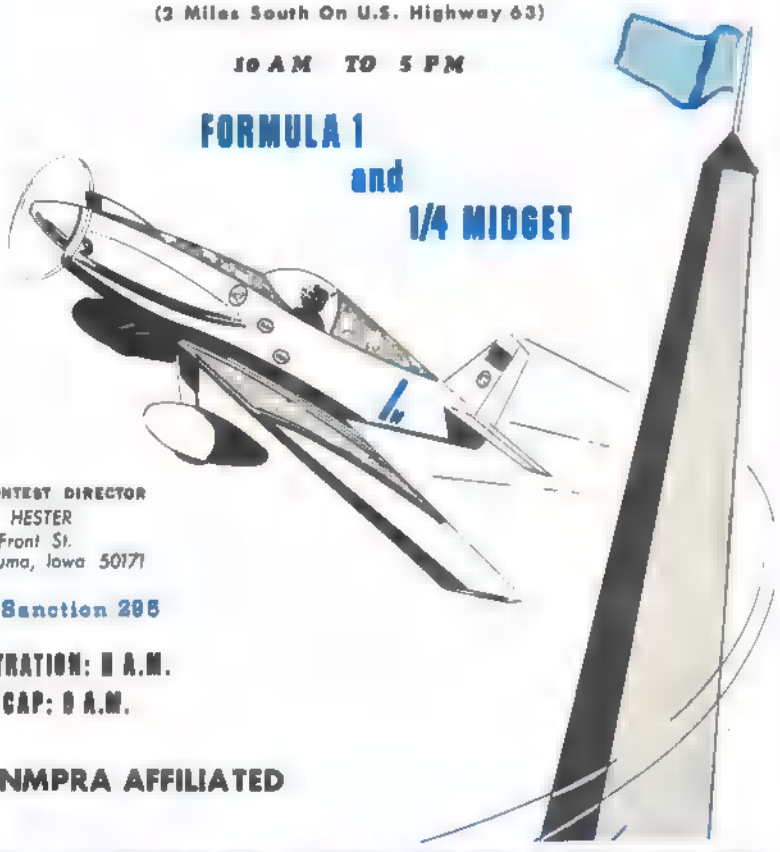
SUNDAY - JULY 21, 1974

[illegible] MONTEZUMA, IOWA

(2 Miles South On U.S. Highway 63)

10 A.M. TO 5 P.M.

FORMULA 1
and
1/4 MIDGET



[illegible] CONTEST DIRECTOR
MAXEY HESTER
401 S. Front St.
Montezuma, Iowa 50171

AMA Sanction 295

REGISTRATION: [illegible] A.M.
HANDICAP: 9 A.M.

CPC NMPRA AFFILIATED

MIDWESTS HOTTEST PILOTS

Send $1.00 Today for

SIG'S BIG NEW CATALOG!

The Modeler's Wishbook"

No Postage Required When Ordering Catalog Alone!

IT'S READY! SIG'S ALL [illegible] FALL AND WINTER CATALOG FOR 1974! Over 256 pages devoted to model airplanes, kits, supplies, tools and related items. Many pages are in full color. This big new catalog features the famous SIG LINE [illegible] kits and supplies, plus practically all other lines available.

For sale at your local hobby shop or send $1.00 today for your copy. NO MODEL BUILDER CAN AFFORD TO BE WITHOUT IT!

ORDERING INSTRUCTIONS

[illegible] **YOUR DEALER FIRST!** If he will not supply you, then order directly from our plant. We will ship promptly. To Order, please add $1.00 for postage and handling in the U.S. Canadian orders please add $1.50. Minimum order is $1.00. Please remit by bank draft, check or money order. Print your name and address plainly. Sorry, no C.O.D. shipments. All prices subject to change without notice.

SIG MANUFACTURING CO., INC
401 S. FRONT STREET MONTEZUMA, IOWA 50171

DO A LOMCE

The lomcevak is the most difficult maneuver in the aerobatic tex elers have been able to perform it successfully. Coached by Ha size Clipped Wing Cub stunter [illegible] well [illegible] RC models, Maxey Hest nique with the Kwik-Bilt* Super Chipmunk that gives a pictu of this wild, tail-over-prop rotation. Here is how it is done:

1.) With the throttle slightly [illegible] than half open, climb at a and roll 1/4 right into knife edge flight.

2.) As airspeed drops, apply full left rudder, full left aile This will throw the model into a fast outside snap roll to the left.

3.) After 1-1/4 snap revolutions, the model will be upright, speed lost.

4.) Give full down elevator, continuing to hold full left rudde

5.) The Chipmunk will tumble head over heels, through 1-1/2

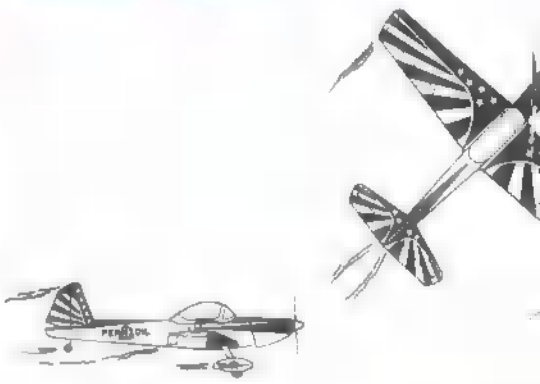
6.) The maneuver [illegible] completed by neutralizing all controls ed at the ground. Holding the controls too long will result in an ou

If you have difficulty achieving the lomcevak the plane's C ward. Also experiment with different throttle settings and climb phase. [illegible] is necessary that nearly all forward speed be gone by is completed. With [illegible] Chipmunk and a little practice, you too, can cevak. Some models simply are not capable of accomplishing th ration, but the Sig Kwik-Bilt* Super Chipmunk, like its full siz readily, along with all the other maneuvers in the stunt pattern.

FLIES LIKE A PATTERN SHIP

LOOKS LIKE A SUPER-SCALE

BUILDS FAST!



FOR THE BEST IN AEROBATI

CEVAK WITH THE SUPER CHIPMUNK

RC SPORT SCALE ■ PATTERN

textbook and few RC mod-
y Hazel Sig, who flies a full-
Hester has perfected ■ tech-
picture perfect reproduction

at about ■ 45 degree angle

aileron and full up elevator.
■.

ght, with most of the forward

dder and aileron.

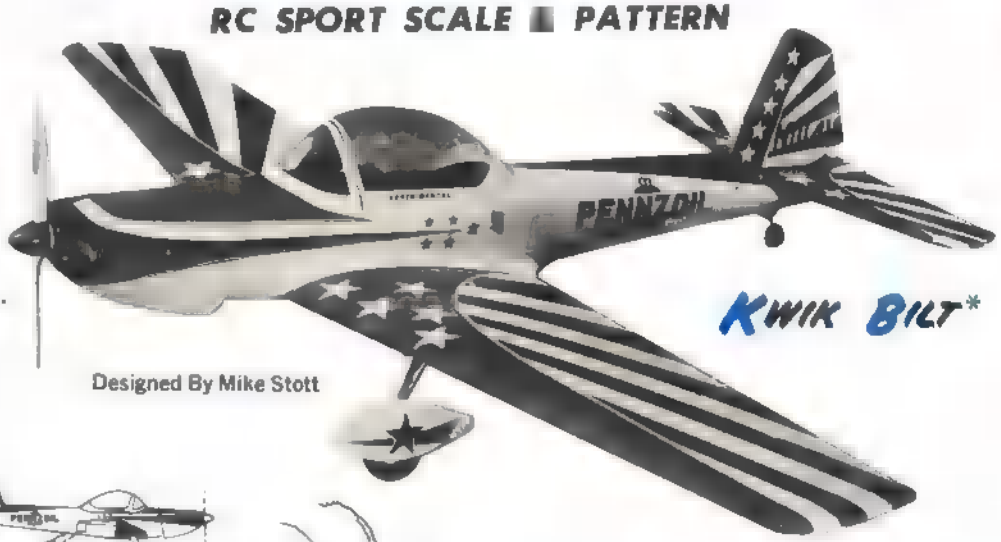
1-1/2 revolutions.

ols when the model is point-
n outside spin.

e's C. G. may be too far for-
limb angles during the entry
■ by the time the 1-1/4 snap
, ■■ be ■ master of the tom-
ng this nearly impossible gy-
l ■■ counterpart, will do it
rn.

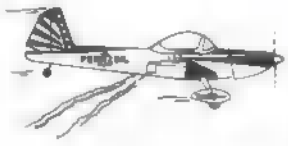
KIT KBRC-1
$39.95

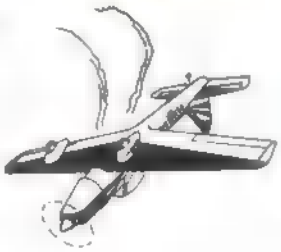
ENGINE: .45 -.61
WING SPAN: 64"
WING AREA: 660 sq. in.
WEIGHT: 6¾ lbs.

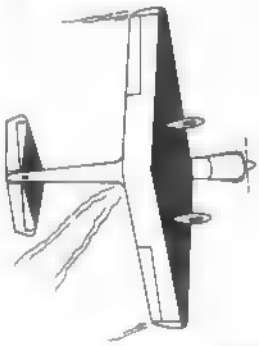


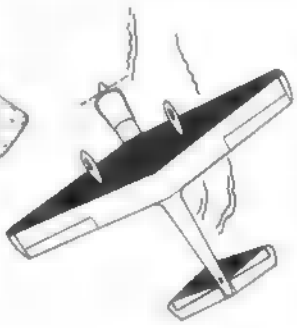
KWIK BILT*

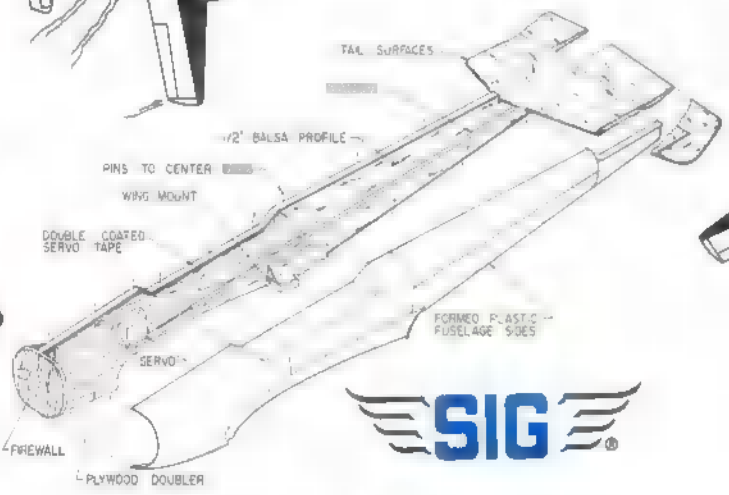
Designed By Mike Stott











SIG®

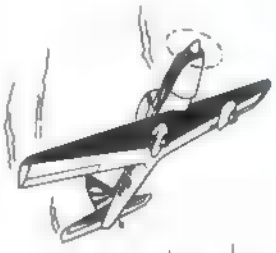
SPEEDY NEW ASSEMBLY METHOD

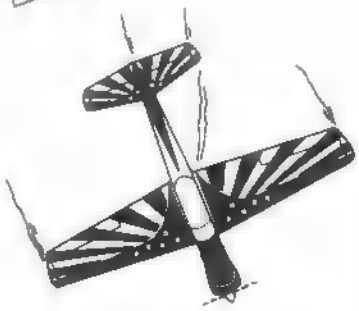
Formed Plastic Fuselage Halves with Skin Detail
Molded Plastic Cowling and Wheel Pants
Clear Canopy with Integral Framing
Pre-Bent Torsion Bar Landing Gear
Precision-Cut Foam Wing Core
Solid Balsa Internal Profile
Step-By-Step Instructions
Formed Plastic Wing Tips
Sheet Balsa Tail Surfaces
■■■ Balsa and Plywood

HARDWARE PACK INCLUDES:
Molded Nylon Control Hinges
Molded Nylon Control Horns
Double-Coated Servo Tape
Tuf-Steel R/C Links

BALSA WING SKINS

*Patent 3699706





ABOUT THE KWIK-BILT CONSTRUCTION SYSTEM:

Unlike ■■■ other plastic fuselage models, the wing and tail surfaces ■■ not mounted on the plastic shell. The ■■■ and plywood inner profile takes the major flight and vibration loads, protecting the plastic from fatigue cracking. Therefore the Kwik-Bilt shells can be light weight since they ■re essentially only acting as a streamlined fairing over the inner profile. In the kit box the shells may seem a ■■■ flimsy but when installed ■■ the model they are much firmer and present no problem for the flier. It would ■■ useless to make them heavier and carry around dead weight that would increase the wing loading and degrade the top notch flight performance. The slight flexibility of the shells has practical advantages since they will yield in ■ collision, crackup or hard landing and ■■■ not likely to suffer much damage. With ■ Kwik-Bilt fuselage the tail will not fall off in mid air ■■ sometimes happens with a ■■■■■ tional plastic design. The fast installation of the shells on double-coated foam servo mounting tape may seem to ■■ too much of ■ shortcut to builders used to gluing everything solidly together, but it also acts as a vibration and shock absorbing device that increases shell life. Anyone who has used this tape for servo mounting knows how well it sticks. The Kwik-Bilt system is ■■■ and revolutionary, with many advantages, combining flight-tested aerobatic design with unique methods of speeding construction. Try ■ Super Chipmunk or P-51 Mustang for your next project and you will be convinced.

ATIC PERFORMANCE, PLUS REALISTIC APPEARANCE – GO CHIPMUNK!

Where the Action is

ELECTRIC FLIGHT

MITCH POLING ON ELECTRIC FLIGHT

Electric Competition: Practical and reliable electric power for model aircraft has created a need for new classes and rules for AMA competition. Bob Boucher suggests provisional rules as follows:

In all events, one set of rechargeable nickel-cadmium batteries must be used. This set must not be changed during the contest.

RC Power:

(1) In Scale and Sport, electrics can compete with gas. No rule changes are necessary.

(2) Pattern—Two categories: (A) two to three channel radio, (B,C) full house. Present AMA aerobatics used.

(3) Pylon Racing—everyone has been trying to figure out how to slow them down while still having sleek racing machines. This is it:

(a) Use present pylon rules, but eliminate or reduce cross section requirements to reduce weight and drag.

(b) Three size classes corresponding to ½A, QM, and FAI. These would be:

05 Class (typical motor, Astro 5). Wing area 200 sq. inch minimum, weight 32 oz. maximum. Hand launching permitted.

15 Class (typical motor, Astro 10). Wing area 300 sq. inch minimum, maximum weight 50 oz., QM rules, ROG required.

Open Class (typical motors, one Astro 40, two Astro 25s, four Astro 10s). Wing area 600 sq. inch minimum, weight 10 lb. maximum.

(4) Soaring—three new motorized sailer classes, Open/Standard/Scale. Use AMA soaring rules, except for: ROG in scale required, optional hand launch in Open/Standard, two minute motor run, and proof of motor turn off required (such as folding props, pennant drop, etc.)

(5) Old-Timer RC—Same rules as present Old-Timer Free Flight RC. Use a two minute run for soaring competition.

Free Flight Competition:

A motor run of one minute, with a positive indication of motor cut-off, such as a flag drop or folding prop. Three classes are suggested.

(1) 05 Class (typcial motor, Astro 5). Maximum weight 20 oz.

(2) 10 Class (typcial motor, Astro 10). Maximum weight 35 oz., minimum weight 20 oz.

(3) Open Class (typical motor, Astro 25). Maximum weight 70 oz., minimum weight 35 oz.

(4) Free Flight Scale—let electrics compete with gas.

Control Line:

(1) Scale—let electrics compete with gas in scale events.

(2) A separate category for electric aerobatics.

(3) Speed—Three classes, 20 oz., 35 oz., and over 35 oz.

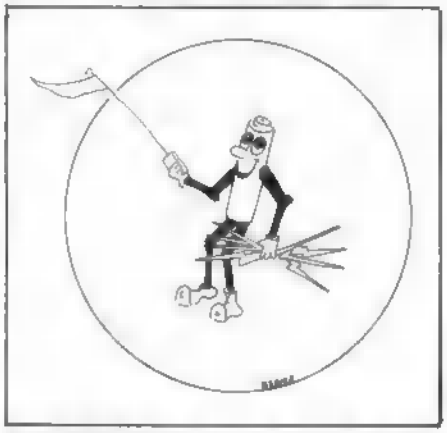
RC Cars:

Two classes—1/12 scale to 3.5 lb., and 1/8 scale to 6 lb. Batteries must be nickel-cadmium.

Send any revisions, comments, or additions you may have to Bob Boucher (Astro Flight) to this columnist. Your comments are appreciated.

On the Test Bench: The Plymouth washer motor is being tested in various modes for use as a power unit for small gliders and ½A control line planes. The following specifications may be of interest to those who are experimentally inclined:

turns per pole	battery	prop	rpm	current
35	5 cells	5-1/4 x 3	12,000	5.5 amps
		6 x 3	11,000	7 amps
35	8 cells	6 x 3	13,000	over 12 amps
		4-1/2 x 2	14,500	not measured
25		6 x 3	10,000	not measured
		5-1/4 x 3	11,000	7 amps



Meet Nicky NiCad: George Beaver, Norman, Oklahoma is a many of many talents. He flies an electric Dick's Dream (Ace Twin Baby RO), and is a cartoonist as well. His cartoon creation, Nicky, the friendly battery, flies electric airplanes with sometimes amusing results. A decal design of Nicky is shown here, and we will feature some of Nick's adventures in the columns ahead. The electric Dick's Dream is George's first RC airplane, and he learned to fly with it. Construction of the motor unit page 114.

Questions and Answers: Roland Boucher sent a list of frequently asked questions from users of the Astro units. Roland's answers are both educational and interesting.

Question: The instruction sheet for the Astro 10 says to charge the battery and operate. The battery will discharge in half the normal time on the ground. Does this mean to fly immediately after the battery is charged?

Answer: The battery can be left charged as long as you like. The rapid discharge occurs only if the motor is operated with the plane standing still. Do not run the motor this way for more than half a minute. Proper cooling of the motor and batteries depends on the forward motion of the plane. The prop also loads down the motor much more when the plane is standing still. This results in high current running through the motor.

Question: Can the Astro 25 fly the Buzzard Bombshell?

Answer: Yes. The 25 flies it well. The photo illustrates Dave Schadel's electric Buzzard.

Question: Why isn't the prop geared?

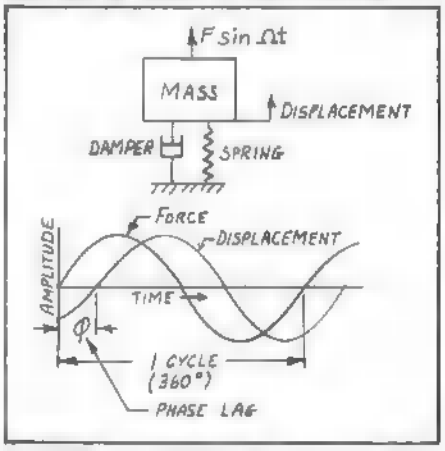
Answer: Everyone asks that, because of the Mattel Super Star and the Graupner Hi Fly. The Astro motors are designed to produce the same power as equivalent glow engines and operate at about the same rpm. At these power levels, regular RC props work fine. If there was any great advantage to gearing, K&B would have done it long ago! At the power levels associated with the Mattel unit, gearing is useful and permits a lighter weight motor. Gearing does not do anything for endurance, however. Good gearing is expensive, and cheap gearing will not hold up at high power levels.

(Continued on page 89)

HELICOPTERS

JOHN BURKAM ON HELICOPTERS

Hingeless (Almost Rigid) Rotor Behavior: If the shaft of a hingeless rotor is held perfectly rigid, the blades will have a flapping natural frequency, somewhat above rotor speed (called omega), depending on how stiff the blades are. On a full-size helicopter, like the BO-105, even though there is no flapping hinge, the blades are flexible that the natural flap frequency is only 1.12 times omega. On a model, where the stiffness-to-mass ratio is higher, the flap frequency may

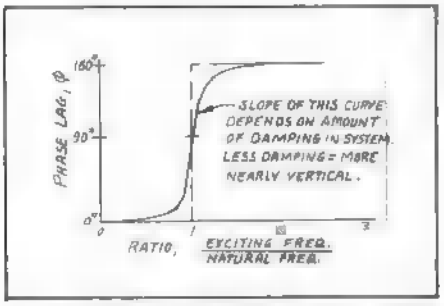


be as high as 1.4 omega. An articulated rotor, with a flap hinge some distance the center of rotation, has a flap frequency of about 1.02 omega; a freely teetering rotor, exactly 1.00 omega.

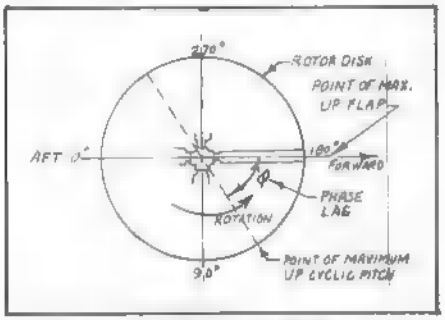
Now if a rigid rotor shaft is not held rigid, but is perfectly free (like a rotor without a fuselage) its flap frequency will go down to one omega, because there is no spring restraint on flapping. Hang a fuselage on the shaft and the flap frequency goes back up, nearly to what it was with a rigidly held shaft. The point of this flap frequency discussion is its effect on control phasing. In the study of vibrations, we learn that if a sinusoidal force is exerted on a spring-mass-damper system, the displacement of the mass will lag the force by some phase angle phi, as shown.

This phase lag depends on the ratio of exciting frequency to natural frequency, as follows:

On a helicopter blade, the exciting force is the one per rev variation in lift caused by cyclic pitch change, or by forward speed. On



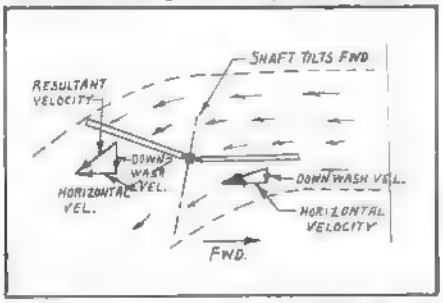
an articulated or teetering rotor, where natural flap frequency is very close to one per rev, the phase lag is 90°, for all practical purposes. On "rigid" rotors, the phase may be 75° or even 60°, depending on blade stiffness and the ratio of fuselage mass to rotor mass. This means that if you want the blades to flap up ■ maximum at the very front of the rotor disk, you have to put the maximum up-cyclic pitch into the blade 75° or 60°, respectively, before that. Thus:



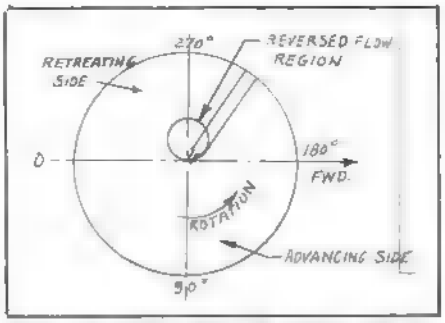
Since the maximum bending moment in the blade occurs when it is at its maximum flapping amplitude, and exactly the opposite 180° later, the situation shown above would cause a nose up pitching moment to be exerted by the rotor on the fuselage. If the CG were too far forward, this is the phasing of the controls to hold the nose up.

Phasing for Forward Flight: For steady, level forward flight, the function of cyclic pitch is to balance the lift on the left and right sides of the rotor. With zero cyclic pitch, the blade going forward (advancing) at 90° azimuth would have the highest lift, because of rotation. At 270°, the lift would be a minimum because of incoming wind velocity, subtracted from velocity due to rotation. So those two points ▬ where the cyclic pitch has to be a minimum and a maximum, respectively. This is 90° phasing.

If the swashplate were phased so that forward stick put maximum down cyclic in at 120° azimuth (for 60° lag), then, to fly forward, the stick would have to be held forward and to the right a little, to put maximum down cyclic at 90° azimuth. Such a simple correction actually would not be enough. Complicating the situation are three more factors: (1) The downwash velocity increases from front to back of the rotor disk, due to rotor thrust acting on the air, ▬ shown below.

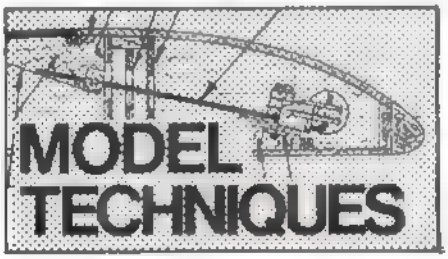


Over the rear half of the disk, the increased downwash velocity would tend to decrease the lift of the blades in that area. (2) So also would the fact that the blades pointing aft are lifted up more than the blades pointing forward. This is due to coning angle and forward tilt of the rotor shaft. To compensate for less lift in the rear, left cyclic (maximum positive at the rear) would have to be added. (3) There ■ a circular area near the hub, on the retreating side of the rotor disk,



where the flight speed is greater than the tangential velocity of the blade due to rotation. In this "reverse flow ▬" the air actually flows from trailing edge to leading edge. As forward speed increases, this reversed flow circle increases, requiring additional cyclic pitch compensation.

Other Phase Requirements: Still ■ different phase angle is required to give the craft a pure pitch or roll acceleration, and another phase angle to hold a pure pitch rate without roll motion. This is why, on a full-scale hingeless rotor helicopter, the Stability Augmentation System (SAS) is so complicated. A pilot likes the aircraft to tilt the exact direction he moves the stick, whether it is hovering, or going forward or pulling out of a dive. On a model, we must be satisfied with ■ compromise phase angle. The BO-105 helicopter, which has no SAS, flies very nicely with a compromise phasing of 75°. This would be ■ good angle to start with on ■ model rigid rotor; that is, pure forward stick puts in maximum negative cyclic when the blade is at 105° azimuth. Continued next month.



FRED MARKS ON RC

In the April 1973 column, we presented ■ "fast charge" circuit for 4.8 volt airborne packs and acknowledged that it was from the MARS (not Marks!) Pulse. The MARS Pulse is an excellent club newsletter from Canada! In any event, there has been a lot of interest in the circuit and ▬ inquiries about its potential use for transmitter packs, provided that I would define the proper resistor values, etc., for that application.

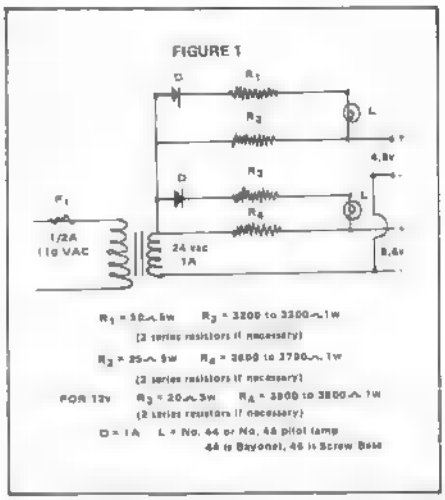
As I have written before, as much as I love to tinker, time just won't permit me to examine all the requested items. However, there is good news! Don Fisher, ■ friend of the folks at ACE R/C, took that circuit and did what you folks were looking forward to seeing. Forthwith, his contribution is presented in a letter to ACE R/C.

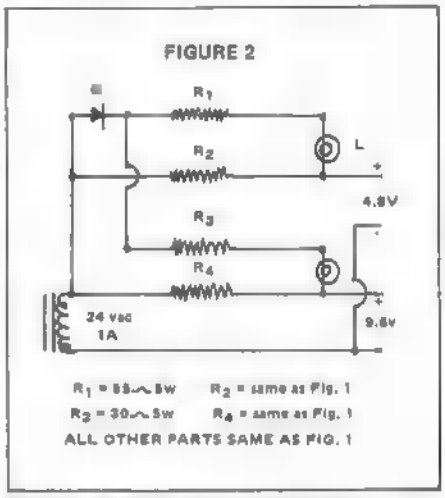
"Here is ■ charger I have used for some time now, and have had excellent results with it. It "conditions" the nicads, and will fully charge 500 MA cells in four hours. The charger can be left on the cells indefinitely without damage.

This is really an improved version of the "MARS Pulse" charger printed in Fred Marks' column, but with pilot light charge indicators added. This has the advantage of indicating whether it is charging or not. If the plug is accidentally plugged in backwards, the pilot lamp will glow very brightly and let you know that you goofed. It is safe and shorting the output doesn't hurt anything; just ■ bright light to let you know that it is ■ short. (Also a warning if ■ ▬ has shorted. *F.M.*).

I have rewired the plug on my digital transmitter to bypass the internal charger and I use this one instead. I get much better lift from both the transmitter and receiver batteries using this charger.

It has the disadvantage of fixed output voltages, but hasn't bothered me because I ▬ 3.6, 4.8, and 9.6 v. only. The 4.8 v output

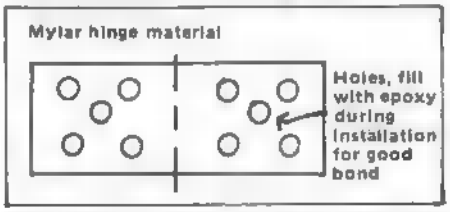




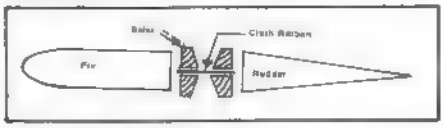
seems to charge the 3.6 v packs alright.

Figure 1 is the recommended circuit. It takes one more diode, but will charge one pack or the other, or both simultaneously. Figure ■ must have both packs on charge or the charge time for single pack is increased to 5 hours. Try it, you'll like it!

When Your Success Hinges on Doing a Good Job: From the Ohming Pigeon, contributed by Nick Fingerhut, Nick uses mylar hinges in his model with good success. Mylar ▬ be obtained from various sources, and most are free of charge. Cut the mylar into strips approximately 1/2 x 1¼". After covering the model, cut slots into the surfaces. Puncture the hinge material at close intervals in the area not exposed after installation. Fill the slots well with epoxy and insert mylar hinge material, leaving ■ 1/16" gap. His method was tried and works very well. (Figure 3)



Cloth Hinges: Method of hinging rudder from Graupner Cirrus kit. This model uses ■ unique and excellent way of hinging the rudder, using cloth ribbon. Figure ■ shows the vertical stab. The cloth runs the entire height of the stab. The only caution is not be get any adhesive onto the cloth between fin and rudder. Works great. No play, no gap and no binding. Fin and rudder is covered after hinge assembly. (One must also avoid getting paint into the hinge. *F.M.*)



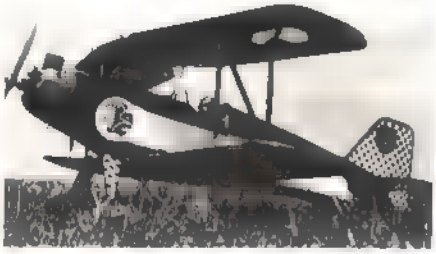
BIPES N TRIPES

O.L. (OLIE) OLSON ON MULTI-WINGED RC THINGS

Greetings Comrads: Welcome to the revolution. We've been saddled with monoplanes long enough. Arise. Return to fundamentals. Recapture the romance, excitement, and easy pace of yesteryear. Think "bipes" and join the multiwing revolt.

Why? You ask. Because it's fun, man. And thats what it's all about. After all, can Otto Lilienthal, Octave Chanute, Orville Wright, and Glenn Curtis (the granddaddies of aviation) all be wrong? They owe their success to the bipe and tripe. We would have had a heck of a time having World War I Air Aces without them. . .no barnstorming in the 20s. . .no fun in the 30s. Let's face it. This is where it started. This is where it's at.

Pat Potega (our astute Editor) and **AAM** think that it's high time that we bipe lovers of America lay it on you other RC types, that we bring you the "good" word, prod you a bit perhaps, help you a little where we can, offer honest evaluation of existing and new bipe kits and designs, keep you up to date on what's going on around the country, and convert some of you to the new worlds of fun to be had with multiwinged RC aircraft. Ol' Dad's going to do just that, with the help of all you current bipe addicts. We want this to be your column. We want your views, your pictures, your problems, your input. We think that we can have some fun and help establish a place in the national RC scene for the "two winger."



A choice rendition of the all-time classic bipe, Ray Brady's Aeromaster.

Larry Quigley's scratch built Bristol Scout C. It flies great, but ground handling is similar to most WWI types.

The first question that should be cleared up is, "Who's Ol' Dad?" He's a Swede from the Indian country of Nebraska, who's old enough to remember the Baby Cyclone and the Red Zephyr and young enough to do a little pattern, quarter midget, sailplane and sport scale flying along with having a love affair with bipes and tripes. He learned a little bit about things that fly through the air at the University of Michigan. He learned a lot more about the subject by bending more miniature aircraft over a period of more years than he's going to admit to. He's a man who believes that there is no end to the fun that can be found in this hobby of ours as long as one hangs loose, keeps an open mind and moves with the tide. He's the originator and CD of the National Multiwing RC Championships. He's Chairman of the Jerry Nelson's National Sport Pattern Association, an embryonic organization which will attempt to bring all the bipe fliers together and come up with some kind of unified national sport bipe program. He's Olie Olson. . .I'm glad to know you.

Now that the necessary (but dull) introductions are over, let's talk about bipes. Due to a strange and seldom recognized malady that afflicts many of our brethren, but most certainly not thee or me, the biplane has been unjustly maligned and grossly misunderstood for low these many years. The malady of which I speak. . .The Flapping Mouth Syndrome. This is a condition wherein the mouth repeats everything that the ear perceives without the assistance of any brain cells to determine the value or validity of the statements involved. For those of you who aren't currently bipe people, let's take a good honest look at the multiwinged aircraft. After a little thought, I think that you will agree that you've been missing a lot of fun flying one.

There has been much mouth-flapping about how difficult it is to handle a tail dragger. Fact: A two-wheeled landing gear, properly located in relation to the CG, and with a bit of toe-in, offers no great problem when installed on a monoplane, and is almost a piece of cake on a bipe or tripe. Multiple wings, and the ability to stagger them as well as set each at its own decalage angle, allow a designer to build in any amount of longitudinal stability he desires. Very simply, this means that a well designed bipe can be difficult, if not impossible, to stall out and snap roll on takeoff or landing, unless someone bumps your arm, and you feed in full aileron and rudder along with the up elevator.

There are a lot of folks who have maintained, in the past, that bipes are for the pros (whoever they are). Not true. . .as much or more inherent stability can be designed into a multi-winged bird as can be in any single-winged one. They are going to be much slower flying than a monoplane with the same span and airfoil section. They can take more physical abuse with less damage than their one-winged counterpart. They are more compact and can have greater structural integrity. I am certain that very little effort would be needed to develop a bipe trainer that would

(Continued on page 89)

L/D =

NEW HIGH CAMBERED SOARING AIRFOILS

ERIC LISTER

This month's L/D column topic is six thermal soaring sections for RC sailplanes. Four of them are brand new and are derivatives of the Eppler series and the Thomann F-4. The remaining two are NACA four-digit sections, 6408 and 6508. All six sections are 8% thick and have camber. While these last two aren't new designs, they are a bit thinner and cambered differently than the usual 6409 and E-385 sections so frequently used on soaring sailplanes. In effect then, you're going to see six new sections.

Before showing the airfoils, let's take a moment to try to explain how these new sections came about and what sort of *installed* improvements you might expect to get if they were to be used in a high-performance RC sailplane. Since I have said that the sections were derived from other high-performance sections, let's start off by taking a look at the parent airfoils from which the new ones came. I'll show just the more important properties. See Table I below:

Unmodified Parent Section Characteristics

Section	E385	E58	E59	F-4	6408	6508
% Camber	5.7	6.5	5.2	7.2	6.0	6.0
Location	40	50	50-60	40	40	50
% Thick	8.3	5.6	5.6	6.0	8.0	8.0
Location	30	20-30	25-30	20	30	30

The E385 section is pretty common on RC thermal soarers and the E58, E59 and F-4 sections are more common among Nordics.

If we wanted a new section to be a bit more qualified for floating than the E385, we'd pick one with a bit more camber. The E385 uses 5.7%, so for the new sections I picked 6.0%. The thickness of the E385 is 8.3%, so, in order to pick up a little performance through reduced wing drag, I picked 8.0% as the max thickness of the sections. Since I couldn't alter the location of the max thickness and max camber on any of the Eppler or Thomann sections, I let them stay they were. Since the location of the max camber point on these four varied from the 40% to 60% chord location, the NACA four-digit sections were selected at 40% and 50% for the spot where the max camber would occur.

The mods on the Eppler and Thomann sections were made by first breaking the parent sections apart into a meanline through the middle of the airfoil, and a symmetrical thickness distribution about that meanline. All meanline and thickness height values were then proportioned to 6% max and 8% max respectively. The last step was to add the new thicknesses to the new meanlines to get the four new sections derived from the parent sections. For the NACA sections, the 64 and 65 meanlines and the thickness distribution were easily available (from my *Sailplane Designer's Handbook*). Adding them together gave the NACA 6408 and 6508 airfoils. If that's as clear as mud, don't sweat it. The coordinates for the new sections are tabulated at the end of this article.

For what it's worth, there seems to be a general trend in the Eppler and Thomann airfoils towards reduced thickness as the camber is increased. This is shown in Figure 1. Note that an airfoil that is cambered 6% would be expected to have a max thickness of if it were to be of the sort designed by Eppler. Figure 1 doesn't mean airfoils thicker or thinner won't "work;" it just that this seems to be the way *these* sections were laid out. Most sailplaners try to with a thin airfoil whenever this seems practical. After doing a little homework in "Fluid Dynamic Drag" by Hoerner at Reynold's numbers of around 100,000, Fig. 2 was made up to give a rough guide to how much potential there is in reducing drag due to friction and flow separation if you can build a thin section.

This medicine seems to be potent if you can apply it and build airfoils of thickness on wings ten-plus feet in span. Just in going from 10% to 8% thickness reduces wing profile drag by about 20%. That's a heap. Fig. 3 shows the result of using thin airfoils on a big 160" span ship with an 18:1 aspect ratio. (Fig. 3 includes all drags that you can easily lay your hands on—wing, stab, rudder, fuselage, and induced drag due to lift.) At an air speed of 24 ft./sec. using 9.6 oz.ft.^{2} wing loading for example, the 8% section would reduce the sink rate by roughly 10% as compared to the 10% section. Building a strong enough section though is going to be a problem unless you're careful in designing and picking material for the spars. For what it's worth, in any wing, for strength, lay the longest side of the spar cross-section horizontally rather than vertically—like and "I" beam. In an "I" beam, it's the upper and lower webs that take all the bending stress. The spot right in the middle of the "I" has no bending loads.

Well, that's the case for some new, thin soaring airfoils. Let's see what they look like. This is shown in Fig. 4. The E-385/Mod 6.0, 8.0 looks very much like its parent airfoil, the E-385, mostly because of its small change in camber and thickness. I don't know that it's possible to rank them yet relative to each other, but let's try to group them. The two lowest-risk sections presented are probably the E-385 Mod 6.0, 8.0 and the NACA 6408. The reason is that the E-385 and the NACA 6409 work very well right now, without mods. The E-385 mod has a little more camber and a little less thickness than the E-385. That's good. The NACA 6408 has the same camber, but is a bit thinner than the NACA 6409. That's good. The E-58 and E-59 Mods and the F-4 Mod all seem to have pretty fat noses, and the E-58 and E-59 Mods have aft cambers. That arrangement worked for the parent sections and may work out on these new ones as well. Turbulator strips near the

(Continued on page 90)

the heat's on...

With Top Flite's New Heat Sealing Tool, now you can finish your model faster and easier than ever before . . . because this new precision made iron was designed especially for, and by the originators of, Monokote and Super Monokote.

* UP SWEPT FRONT—prevents "digging in" • POINTED TIP—for hard-to-reach areas • CONE SHAPED NOSE—to work in and around compound curves and concave areas like fillets, etc. • SIDES TAPERED AND ROUNDED—for perfect bonding in awkward corners • LIGHTWEIGHT—only 11 oz. • TEFLON COATED—prevents scratching, adhesive build up on shoe and insures ■ smooth finish • THERMOSTATICALLY CONTROLLED—maintains constant heat • VERSATILE—ideal for all other heat sealing applications up to 450°.

$16.95
CAT. NO. [illegible]
[illegible] INCLUDED

And now—the most fantastic finish yet with Monokote! No physical contact between tool and covering provides scratch-free, flawless finish. Heats large areas giving more even distribution of shrinkage in less time.

* FASTER—wide nozzle for more uniform heating and shrinking—produces better finish—can be worked as close ■ one inch from Monokote *without melting material.* • TIGHTENS LOOSE COVERINGS—especially with painted surfaces. ■ 3 POSITION SWITCH—for hot or cold air. • OVEN DRIES PARTS—dust free. • SETS—glues, resins, paints, etc.

$24.95
CAT. NO. HQ-775

TOP FLITE

TOP FLITE MODELS

2635 SO. WABASH AVENUE, CHICAGO, ILLINOIS 60616

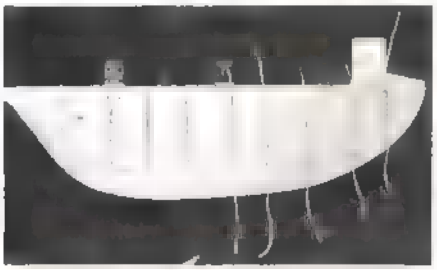
FOR THE BEST COVERING JOB YOU'VE EVER SEEN, USE THE TOOLS THE EXPERTS USE!

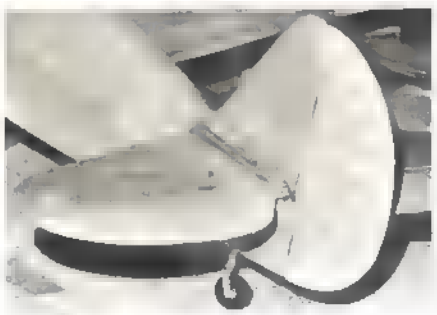
SCALE

BILL BOSS ON CL

Simulated Fabric Covering: Again this month we present a tip on how to dress up that sport scale ship of yours. Almost all of the kits sold for sport scale employ the simplest form of construction. Rather than require you to build up flying surfaces, such as ailerons, rudder, and elevators, most manufacturers provide stamped balsa sheets of varying thickness for these parts. The solid wood parts may be alright for planes that have smooth metal finishes, but what about planes that have fabric covered flying surfaces? How do ■■ get the fabric look? What about the ribs that are usually visably detectable with fabric covering?

The first step in obtaining the fabric look is to carve, sand, and apply a couple of coats of clear dope to the appropriate solid wood part. Next, using a three-view drawing as ■ reference, mark the rib locations on the model part with ■ soft lead pencil. You ■■ now ready to put the ribs in place, ■■ shown in Photo A.





The ribs are nothing more than kite cord cut into lengths which are about two inches longer than needed. After the required number of kite cord ribs have been cut, apply a bead of glue (I found that Ambroid worked well) to the rib lines drawn on the part. Now take a cord rib and, holding it taut by both ends, place it on the bead of glue. Hold it in this position until the glue is set. Repeat this procedure until all the ribs are in place.

When the glue has hardened, apply ■ second coat to the top of the rib, and smooth it out with your finger. When the glue is completely dry, cut off the excess cord about 1/8" short of the outer edge of the part (this can also be seen in Photo A). Now sand the ribs very lightly with fine sandpaper.

The part is now covered with heavy silkspan, and finished with ■ few coats of clear dope. The elevator, rudder, etc., is now ready for mounting on the plane. While this type of construction may not be adequate for true scale models, it certainly will give the built-up, fabric-covered look to ■ sport scale model, especially from the vantage point of the judge, standing ten feet from the model during static judging.

Scale Propellers: Ed Dunstan, writer of the "Scale View" column in the *Aero Modelers of San Jose Newsletter*, tells us of a Bay Area modeler who produces quality scale replica propellers for display and judging purposes. If interested, contact Ira Keeler, 407 Beelard Dr., Vacaville, Calif. 95688 for information on types and cost.

Contestants Wanted: West Coast CL modelers take note: You are wanted at this year's NAA Flightmasters (of Los Angeles) contest. A note from Roland Baltes, San Pedro, Calif., indicates that the Flightmasters have agreed to include ■ CL Scale event in their annual contest (apparently for the first time) and that the addition of Scale and other CL events in future meets will depend on this year's

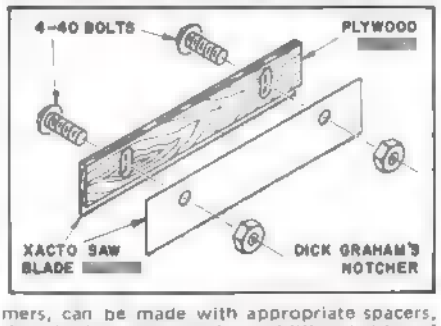
JU-88D by Roland Baltes, San Pedro, Calif. was ■ fifth place winner at the Annual Southwestern Regionals held in Phoenix, January, 1974. Two ST 40 rear-rotor engines provided power for this smooth flying machine which was built to a 1"-1' scale.

turnout. So, let's make it ■ good one. We sure can use all the promotion of CL Scale that we can get. The contest will be held ■ the Los Angeles Area on the weekend of October 5-6, 1974. For contest site location and other details, watch the AMA Competition Newsletter or contact Roland Baltes at 1021 Bloomwood Rd., San Pedro, Calif. 90731.

CLAUDE McCULLOUGH ON RC

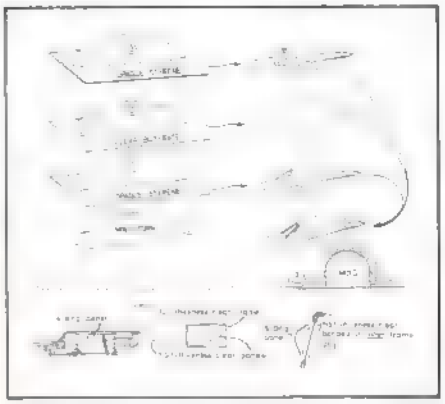
Firefly Flies Again: Readers will recall the drawings and discussion by Jim Newman in this column (April 1974 AAM) about the unusual Youngman flap system on the Firefly Mk. 5. Coincidently, the April 1974 issue of *Flying* magazine featured the Firefly that Canadian Warplanes Heritage, Inc., has restored to magnificent flying condition. A double page cover, plus six other color photos, several of them close-ups of the flaps in operation, provide a tailor-made start for a scale presentation of this colorful WWII classic. Add Dave Platt's fine three-view, from the November 1973 issue of AAM, and get going on a super ■■ Sport Scale version of an ideal subject that just must be modeled.

Handy Dandy Notcher: A neat little gadget devised by Dick Graham makes cutting notch-■■ in leading and trailing edges and formers ■ snap. Snip an old X-acto saw blade in half and drill or punch two matching holes for 4-40 bolts in each half. Spacers are made from plywood with elongated holes lined up with those in the saw blades. For the notcher to take a 1/16" cut, make the spacer from 1/32" plywood. For 3/32" cuts, ■■ 1/16" ply. Wider cuts, such ■■ may be needed for formers, can be made with appropriate spacers, though they may need ■■ additional shim of cardboard ■■ 1/32" or 1/64" ply to get the exact dimensions of the required finished notches. The depth of cut is regulated by moving the spacer up or down, until the right amount of saw blade is exposed. After the notches ■■ sawn with the tool, the waste wood between the cuts is easily cleaned out with an X-acto knife.



Framed: Keith Ward of the Chicago Scale-Masters shows how to produce the ultimate in canopies in the following text and drawings:

"Do you groan every time you see another



ripple-surfaced canopy with taped or painted frames on an otherwise superb model? Ever notice that on real aircraft such as the Ju 87D and the Me 110, some canopy areas are framed on the inside only? Here's how to solve the problems. Make a wood mold to use with a vacuum forming machine or for stretch-molding heated plastic sheet. This mold should be undersized by three layers of the molding plastic you will be using. First layer, opaque styrene, leave on mold; this becomes the inner canopy frame. Lubricate the first layer with Silicone Spray or Vaseline (eliminates ripples in the clear layer). Form the second layer from clear butyrate and leave on the mold. The third layer, opaque styrene, becomes the outer frame. Clean all parts with detergent, trim and paint the frames. Bond together with Permabond, contact cement or epoxy. Don't use plastic cement; it will fog the canopy in time. For sliding or hinged canopies, cut the completed assembly apart and fasten appropriate tubes, tabs, pins, hinges, etc. to frame and attach to the model.

New Math II: Our request for scale calculations brought the following reactions from Bob Boucher:

"Bob Wischer's paper on weight and power scaling in your May 1974 column intrigued ■■. This sort of analysis has been needed for a long time and will greatly increase the chances of success in any scale venture. Bob's Emeraude was a real beauty and one of the best flying ships at the '73 Nats. However, I would like to suggest that his scaling rule for power is not appropriate. I feel it is more appropriate to scale *thrust* by the cube of the scale factor. This results in the model having the same thrust to weight ratio ■■ the original and would make for more realistically flying models. To see why this is so, let us do a little analysis. Since the gross weight is scale as the cube of the dimension

$$(1)\quad W \simeq S^3$$

Then the wing loading will vary directly as the scale factor. This results in a model that "flies" or handles like its big brother. We here at Astro Flight agree 100% with Bob on this and indeed have been using this scaling law in our government RPV work for the past few years. Now, if the wing loading varies as the scale factor

$$(2)\quad \frac{W}{A} \approx S$$

Then the stall speed, cruise speed, and top speed of the scale model will vary ■■

$$(3)\quad V \simeq \sqrt{S}$$

The thrust required to fly the model in level flight is simply the gross weight divided by the lift drag ratio (L/D). And since we are talking about *scale models*, the L/D will be about the same except for the effect of Reynold's number, which will decrease drag ■ little. Thus thrust is proportional to weight (constant thrust to weight ratio) or from (1) we have

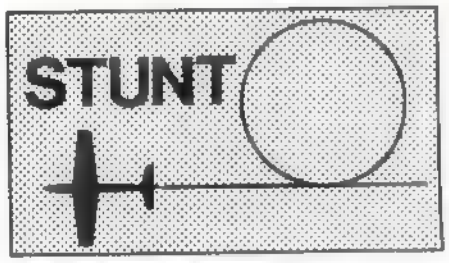
$$(4)\quad T \simeq S^3$$

The power necessary to produce this thrust is the product of thrust (4) and velocity (3) which gives a power scaling law for power to weight ratio of

$$(5)\quad P/W \simeq S^{1/2}$$

If scale laws 4 and 5 are adhered to, then the scale model will climb, cruise, and accelerate just like the big one.

(Continued on page 90)



LEW McFARLAND ON CL

Nitro Controversy: Al Rabe has forwarded a letter from Dave Gierke, which questions some of Al's remarks on the use of increased percentage of nitromethane in stunt fuels. Al is concerned that some may have misunderstood or misapplied his information, even though parameters were given.

To quote Dave: "A note concerning the discussion on control-line stunt engines running hot and possible cures. It was stated that 'adding nitro methane reduces the engines operating temperature because. . .when you displace 9600 BTU menthol with 5000 BTU nitro, the total heat energy of the fuel is reduced.' This statement is misleading, as to how nitromethane affects fuels.

"Without going into detail, we might more correctly say that adding small amounts of nitromethane *may* improve a stunt engine's 'ignition timing.' Nitromethane burns slower than methanol. Thus, when added to methanol fuel, the overall burning *rate* is reduced, hence delaying the build up of peak cylinder pressures. The controlling factors associated with ignition timing are (besides modified fuel burning rates) (1) rod length/stroke ratio, (2) deSaxe offset, (3) compression ratio, (4) the rpm at which the engine is being operated.

"In the latter case, the engine may be running hot because the burning rate of methanol is too rapid for the speed of the moving piston. Therefore, peak cylinder pressures would occur somewhat before top dead center, causing excessive heat transfer into the piston/cylinder/head.

"Several alternate solutions to this problem would be: (1) Allow the engine to speed up by reducing pitch and/or diameter of the prop, thus improving the relationship between piston speed and fuel burning rate, with respect to where peak cylinder pressures occur. (2) Lowering the *compression ratio* by shimming the head up. . ., raising the exhaust port. . ., or raising the entire sleeve (shim under flange).

In closing, it is important to note that an engine's internal design (points 1 and 2), coupled with where it wants to run on the rpm range, will determine whether or not the addition of small amounts of nitromethane will improve a problem of overheating. Finally, be advised that the addition of greater amounts of nitromethane to the fuel will inevitably increase the engines operating temperature."

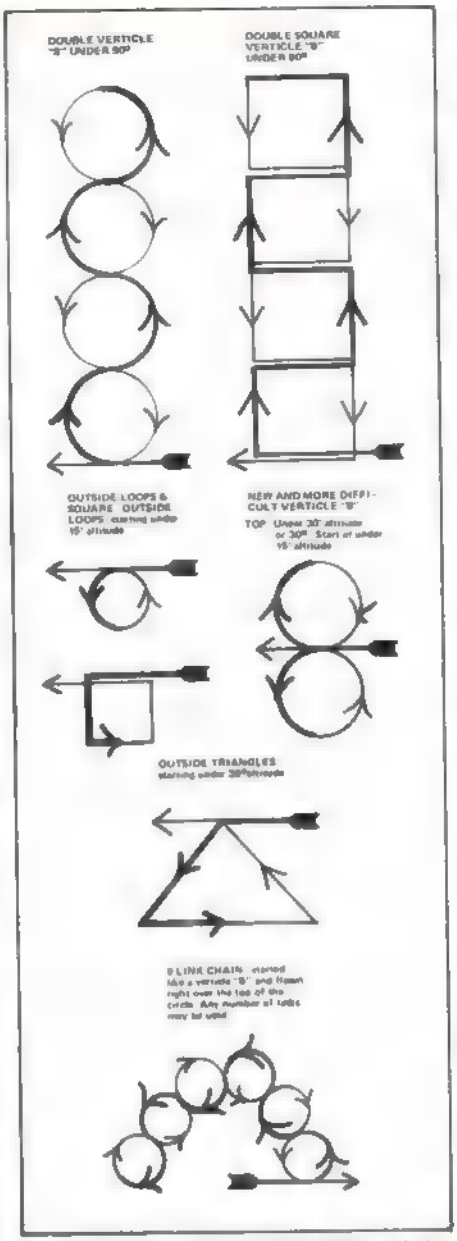
Other than the facts at hand along with the observations, we should all be careful not to take information out of context.

What Happened to PA?: I was under the opinion that the Offical name of our event was Control Line Precision Aerobatics. However, the 1973 and 1974 AMA rule book lists CL Aerobatics. Who changed the name??? I personally prefer to keep precision in our Aerobatics, but admit it can get boring to both the flier and the spectator. Some people (e.g., George Lieb of Omaha, Nebraska) would like to see a return to the "Red" Reinhardt days of 90 mph, 18 inches off the deck STUNT. George Lieb says, "Harold 'Red' Reinhardt, probably the best stunt flier in history, quit the sport when his 90+ mph stunt patterns started getting beat by slower inferior patterns."

George suggests some very challenging maneuvers, all of which have bottoms *under* 18 inches, e.g., Double Vertical Eight under 90°, Double Vertical Square Eight under 90°, Outside Loops, Squares, and Triangles each starting at 30°. Sounds interesting, but not for our present breed of design. If you get bored, try doing the pattern from inverted position (the plane that is).

Apparently, we will never come up with an event that will fit the needs of all fliers, but I do suggest full utilization of PAMPA as a sounding board for innovative ideas and suggested changes, as well as expression of dissatisfaction with the present state of our speciality group and/or event. Wynn Paul, as PAMPA STUNT NEWS EDITOR (1640 Maywick Dr., Lexington, Ky. 40504) is doing a fine job compiling and disseminating information as well as polling opinions. Another good example of the fruits of the labors of this young group is the District V PAMPA Invitational (everyone invited)—Stunt Only

(Continued on page 91)



DON LOWE ON RC

In a "Pig's" Eye!: The Pioneer RC Club of Sunnyvale, California, has created a title of greatness—one to be sought by great dint of will and effort; for "PIG" "Pioneer to Immortalized for Greatness." Now that may be stretching things a bit and it may sound hammy (Oh!), but it has to do with the setting of Pioneer RC world records. How about that?

The Pioneers are promoting a nice gimmick, that a number of clubs are pushing, to stimulate interest and to create an atmosphere of friendly competition. Other clubs, such as the Eglin Aero Modellers, have reported various record categories, but the Pioneers have established the following initial list:

1. Duration: simple maximum duration with the engine running throughout, and at landing.

2. Loops: the most loops in a 3 minute interval.

3. Spins: the most spins in a 3 minute interval—no set time to climb. Presumably, the craft must be kept in sight.

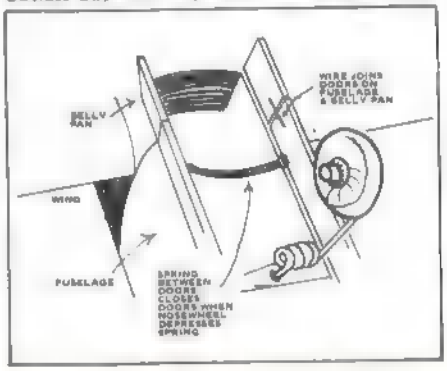
4. Highest weight to power ratio: make the heaviest plane fly with the least power. (Simply divide the plane's weight by engine displacement.)

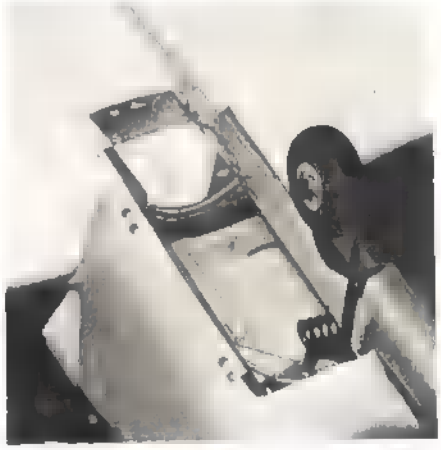
5. Worst crash: no record attempt need be advertised for this one—for who would want to plan such a thing? The record is determined by measuring the distance between the outermost extremities of scattered parts. The scattering must be due to the crash, and not because the pilot threw things afterward! Now, this record category is absolutely unique and, hopefully, not one to be sought, but if you're going to crash, try to make it a good one!

The Pioneer newsletter *Modulator* Editor Tom Minger, closes with this thought. "What do you get if you capture a Pioneer World Record? You have the knowledge that you have excelled beyond your wildest dreams. Your name will appear in print each month you hold the record." He continues, "You will be in the company of O.J. Simpson, Babe Ruth, Phil Kraft, and all other record setters and, finally, you will give me something to write about!" - the plaint of every newsletter editor and, may I say, magazine columnist!

Tom Minger also writes of the history of RC modeling. In particular, the question of who designed, built and flew the first RC model was raised. His research indicates that it was Chester Lanzo, whose model was first flown publicly in July, 1937 at the NATS in Detroit. The radio was a single tuber, and used a magnetic field to move the rudder. The ship was a nine foot polyhedral monster. O.K., you guys, is this correct, or do you have other information?

Close the Door!: From Honolulu, James Kubo sends a hint for a basic system of closing up that big hole for the nose gear. His Cutlass Supreme required articulated door,





James Kubo's retract door mechanism. Note that the doors are segmented, and that a simple spring does the job. (photo by Jim Miura)

but most pattern ships don't have a wheel well inset into the wing. The mechanism is actuated by a common spring stretched across the doors. Jim uses Rhom retracts.

Small but Strong!: The Long Island Radio Control Society newsletter, *Low Passes*, Feb/March issue, lists some interesting statistics relative to some of the minorities in the U.S. You might be interested to know that or-

ganized modelers are ■ extremely small minority. Some of the "Name Brand" minorities in the U.S. are as follows (1973 Census estimates): Women—106,786,000; Blacks—22,972,000; NRA (National Rifle Ass'n.)—1,011,000; AAU (Amateur Athletic Union)—225,000; AMA (Academy of Model Aeronautics)—39,702, as of 2/24/74.

Interestingly, the *Reader's Digest Almanac* for 1973 doesn't even list the AMA, while it does report on the American Power Boat Ass'n. (6000 membership) and the U.S. Golf Ass'n. (4000 member clubs). *Low Passes* Editor, George Myers was simply trying to make the point that modelers in the Long Island area must work together to secure flying sites, and the public's acceptance, that is enjoyed by golf clubs, boaters, baseball lovers, archery buffs, etc.

I might add that we in the Dayton, Ohio, area have found this necessary, to gain the attention of people ■ authority who can provide such facilities. We formed a group called "DAMAC" (Dayton Area Model Aircraft Clubs), which is supported by six local clubs and provides a unified voice in such dealings. This organization has been found effective in current negotiations with the city fathers.

That Poor Inanimate Object!: Man is a funny animal; he treats inanimate objects as though they were capable of human functions. Unfortunately, however, machines can't think, or at least most can't yet, and therefore cannot share the responsibility for good or bad performance. They ■■ simply objects of our imagination and creation—good or bad, they reflect our own capability. Many modelers think of their birds as living things, and often name them accordingly; to wit, Daddy Rabbit, Phoenix (mythical bird), Banshee, Minnow, Sparrow, Falcon, etc.

When things go right, we smile and pat its sleek fuselage, but when disaster strikes we blame everything and everyone, except ourselves. For example, at a recent contest I had a bad experience with poor engine idling and it cost me a number of places at the contest. My natural reaction, when asked about the difficulty, was to blame the poor stupid engine. Poor thing, if it could think, it would probably chew me out good for expecting something beyond its capacity.

Or, when we crash because of a control failure of some sort, we blame everything except our own inability to create a perfect machine and to keep it functioning that way! So, the next time your pattern beauty strikes *terra firma* in a most terminal fashion, don't throw your transmitter or jump up and down on the sorry remains. Instead, invite your buddy to boot you one in the lower extremity for allowing such a thing to happen, and vow to do better next time. Remember the machine that works and works and works some more without bashing, encompasses more than ■ fortuitous package of luck, but, also, embodies your ability to keep it working that way!

In this vein I would like to dredge out of our local WORKS Club newsletter, the *Worksheet*, ■ bit of instructive humor (?) created by our own beloved president, Chuck (by gosh) McCosh. Chuck writes:

"Woe is me, for the month of March has taken its toll again. It seems for the last three years in a row, I always manage to prang an airplane in March. There has to be a combination of factors which come to play here. First, the weather—it's so...miserable that by the first hint of a passable day, I'm out there clicking my heels to go airborne. (Rule No. 1: DON'T BE CAUGHT CLICKING YOUR HEELS.)

"Second, the reflexes must get a little stale and the mind suddenly has less regard for *caution*. More chances are taken—like flying in ■ thunderstorm or 30 mph winds. (Rule No. 2: RECONSIDER—WHEN YOUR MENTAL STATE HAS GONE BANANAS!)

"From the foregoing statements, you can see that I blame this annual ritual on Pilot Error, not the machine, and this is what I really want to talk about. Now pilot error is a simple term, a grievous term, ■ concise term, and it seems to be so final, like you've been trapped with no way out. Taken for its shock appeal, 'pilot error' ranks up there with words like CANCER, PLAGUE, DANGER, CRASH, BURN, IMPACT, etc.

So pilot error and/or the crash are usually the mainstays of hours of conversations in ■■ RC club, and ours is no exception. On any crash day, there are usually ample on-lookers who could probably ■■ classified in two groups: 'the buzzards,' and 'the vigilantes.' Now the buzzards are the ones who are the first to help reclaim the death and carnage. They hunt for wheel collars, control horns, wheels and landing gear. Without mentioning any names, Charlie Emmel seems the best buzzard in the bunch. Less than three minutes after retrieval, he asks, 'Gee, that was a tragedy...but since you really don't need your landing gear, do you mind if I use it now?' His one boy carted off the wing to his car with designs on making ■ ukie ship out of it, while the other was begging ■ tail section, a control horn, ■ broken prop, or any suitable sourvenir. (Has anybody checked this fella's Tx in the impound area?).

"Next, the vigilantes. They're the ones that go after that hasty conviction. They're the first ones to yank your radio gear from that twisted bulging fuse and reconnect all the leads. So it goes: 'Well everything seems to operate smoothly and perfectly.' 'Did you *really* notice any difficulties?' They steal through the night and leave burning crosses on your front lawn with the words 'pilot error' inscribed on the cross-members. Again, without mentioning any names, Bob Bremer is *numero uno* ■■ my vigilante list! May the sacred cow leave ■ holy relic on *your* taxi strip. Somebody ought to keep score on our forthcoming field tombstone; like: buzzards—3, vigilantees—1."

"Pattern Aircraft Design Made Easy" or, "How To Do It Overnight": The heading is misleading, because there just ain't no way! You tweak ■ design for years trying to achieve the perfect configuration, but there isn't any such animal! Even for fixed design, it seems impossible to build two that fly alike. This is largely due to our primitive building techniques and lack of building jigs, control of materials, etc.

It also seems impossible for people who build a particular design to put in the correct dihedral—and this is important. I've had ■ number of people ask about ■ strange rolling tendency when applying rudder, or failure of the bird to pivot cleanly around a wing over, or failure to hold knife edge without application of aileron. The problem is improper dihedral angle.

Essentially, the craft should be set up so that application of rudder in straight and level flight results in a flat skid or yaw *without any rolling tendency*. Very simply, if the dihedral is too great, the craft will roll in the direction of applied rudder. Conversely, if the dihedral is too little, the craft will roll opposite applied rudder and exhibit what we call adverse yaw. One of the first things to check in flying ■ new ship is correct dihedral angle in the manner prescribed. I have played with dihedral angle on my Phoenix design and have been able to prove the foregoing by increasing and descreasing the amount of dihedral. Improper dihedral will screw up a lot of things, to wit:

Too Little Dihedral

1. The craft may roll opposite the applied rudder and "flop out" on top of wingover.
2. The craft will not hold a knife edge but will "roll under" ■ try to invert.
3. The bird will seem unsteady and be hard to setup and track through maneuvers. It may even wander in straight flight and be extremely sensitive to trim and control.
4. The roll rate may vary through the roll with a fixed aileron deflection.
5. The roll may not be as axial as it should be.
6. You may have to hold "top" aileron in extreme cases to prevent over-banking or ■■ unwanted increase in bank angle in a turn.

Too Much Dihedral

1. The craft may roll on application of rudder and change heading in the wing over.
2. The ship will roll in a knife edge and require application of aileron opposite the applied rudder to prevent rolling out.
3. The bird will be more affected by gusts and may track better through inside loops, but worse through outside loops.
4. The roll rate will vary in a roll and increase while inverted.
5. The roll may be "barrelly."

Aircraft Models in Civic Center Museum Exhibition: "Aero-Crafts '74," an exhibition of model planes spanning more than sixty years of aviation, was in the Museum of the Philadelphia Civic Center from Saturday, March 23 through April 19, according to John Pierron, executive director of the Civic Center.

The exhibition was co-sponsored by the Academy of Model Aeronautics of Washington, D.C., and attracted entries from modelers in six states.

A panel of judges, consisting of Paul E. Garber, Historian Emeritus of the National Air and Space Museum of the Smithsonian Institution, Frank Piasecki, President of the Piasecki Aircraft Corporation, and Paul C. Heintz, aviation writer for the Philadelphia Evening Bulletin, selected planes for the exhibition and chose prize-winners in a number of categories.

There were nearly 100 models on display, including planes from pre-World War I through post-World War II navy, marine and sport planes; tri-motors and passenger aircraft; Spads; Fokkers; amphibians; helicopters and many others. Included in the display were radio control, control line and free flight models.

Modelers have participated in many exhibitions and displays over the years but rarely in so prestigious surroundings. Another example of modeling achieving a quality image. Let's hope it continues!

A small segment of the models displayed at the Museum of the Philadelphia Civic Center.

Chicago Expo No. 2: Due to increased demands for space, Chicago Expo No. 2 will be held at larger facilities this year. The site will be the DuPage County Fairgrounds in Wheaton, Illinois. Dates ■■ Nov. 2-3.

In addition to the regular trade show, there will be flight demonstrations, car racing, ■■ well as static displays of all types of models. Something special this year will be model boat demonstrations and races in the fairground's lake. For details contact: Bill Coons, 1230-C Bunker Hill Ct., Wheaton, Illinois 60187.

15th Annual Eastern States Radio Control Championships: This contest, with variations, is one of the oldest model aircraft contests in the world. This event was first conducted by Leon Shulman, Academy of Model Aeronautics Life Member No. L-8, in 1937 at Hadley Field, South Plainfield, N.J.

This year, the contest will be conducted by the Central Jersey Radio Control Club in consort with the Kiwanis Club of Piscataway, N.J. and the Circle "K" Club of Middlesex County College. The location has been changed to Rutgers Football Field "E," located adjacent to the Rutgers Football Stadium, Piscataway, N.J. This location is an ideal flying field in that it is over three football fields wide by over one field long.

Starting time, rain or shine, is Sunday October 6, 1974 at 8:00 A.M. The events are: A, B, D Novice, D Expert, Stand-off Scale and AMA Scale. The flite program will be by the successful Shulman Flite Processing System. Prizes in excess of five thousand dollars in merchandise will be awarded to the contestants. Contest Director will be Leon Shulman, 1114 Raritan Rd., Clark, N.J. 07066.

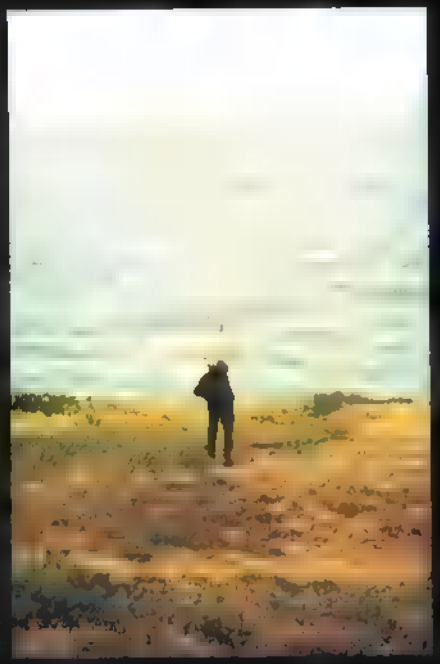
Where the Action Is columns are what you readers are doing, making, ■■ flying. Support your columnist with articles, photos, and ideas. Sketch your neat gadget. We'll draft it for presentation. Each item earns you ■ $5 bill. Submit to the writer, c/o AAM.

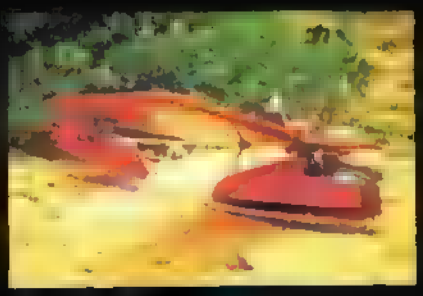
Sailplanes

A Pictorial Essay

...tartling as it is that all visible ...dence of invention should have been refined out of this instrument and that there should ... to us as natural as a pebble polished by the ... wonderful that he who uses this instrument shou... able to forget that it is a machine...In the end there is a ... flawless in its ... spontaneous whole, its parts mysteriously ... together and resembling in their unit...

Antoine ... Exupery





Photos by Carol Simowitz

DURATION

CARL MARONEY ON RC

Soaring Rules Proposals: I was recently appointed Chairman for the RC Soaring Advisory Committee (SAC). May I suggest that anyone desiring changes to the current AMA soaring rules, which were published in the '74/'75 AMA rules book, please submit your ideas. All proposed changes must be submitted on a formal "Rules Change Form" which is available from the AMA Headquarters. Upon completion of this form, return it to AMA for channel processing.

Effective 1974, the AMA Executive Council voted that rules can only be changed every two years. In essence, this means that the current AMA rules will be good through 1976. However, the word is that the 1 June deadline date may be extended until 1 September, 1974. Regardless of these dates, soaring enthusiasts should not wait until the deadline dates are announced. You should continue to forward inputs, in order that sufficient time may be allotted for the SAC members to review all inputs adequately.

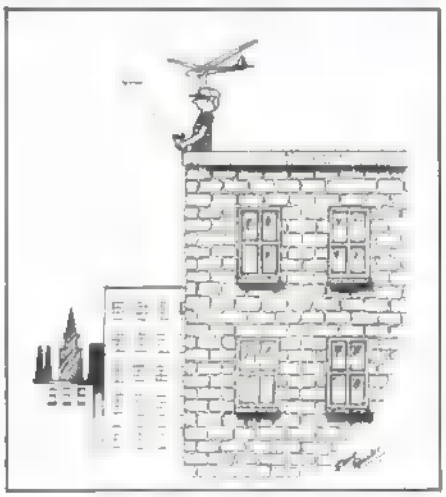
This committee is composed of eleven representatives, who are selected by the District Vice-Presidents on a yearly basis. The SAC members' functions are to: review proposals, submit recommendations and collectively advise the RC Contest Board of our desires. The SAC has been dormant since its inception, due to a lack of coordination. May I advise you all that the Soaring Advisory Committee now stands to serve you and become your voice with the AMA Headquarters. The advisors now ask for your help, by letting ■ hear from you. The AMA District chart shown below will assist you, when determining whom you may contact.

AMA DIST.	STATES	SAC REPRESENTATIVE
I	Maine New Hamp. Mass. Vermont Conn. Rhode Island	Richard Jansson 6 Pine Street Wellesley Hills, Mass. 02181
II	New York New Jersey	Gil Rifkin 18 Carmen Drive Nanuet, N.Y. 10954
III	Penna. Ohio W. Virginia	Fred Collins 29 Stewart Avenue Pittsburgh, Pa. 15227
IV	Maryland Delaware Virginia N. Carolina	Carl Maroney P.O. Box 170 Kensington, Md. 20795
V	S. Carolina Georgia Florida Tennessee Alabama Mississippi	Chuck Anderson Rt. 4, Box 154 Tullahoma, Tenn. ■■■
VI	Indiana Illinois Missouri Kentucky	Neil Liptak 325 O'Neal Street Joliet, Ill. 60436
VII	Michigan Wisconsin Iowa Minnesota	Earl Pell 907 Medford Ct. Rochester, Mich. 48063
VIII	Arkansas Louisiana Texas Oklahoma New Mexico	Dale E. Nutter 2498 E. 49th Street Tulsa, Okla. 74105
IX	N. Dakota S. Dakota Nebraska Kansas Colorado Wyoming Montana	Jim Simpson 2636 Forbes Drive Omaha, Neb. 68123
■	Arizona Utah Nevada California Hawaii	John Donelson 16162 Littler Dr. Huntington Bch., Calif. 92649
XI	Washington Idaho Oregon Alaska	Donald Toepel 1040 S. 174th Street Seattle, Wash. 98148

ELECTRIC SOAR: Bob Boucher has undertaken to generate a rules proposal, since the advent of practical and reliable electric power has created new possibilities for the motor glider enthusiast. Bob feels, and rightfully so, that it is imperative, at this time, to define new rules and classes for AMA competition. Therefore, he submits the following to solicit your comments and advice, and to arouse your imagination. Currently, three new motor sailer classes are suggested for Unlimited, Standard, and Scale classes. The three classes can be covered under the current AMA soaring rules, with the following exceptions: In the Scale class the model would be required to ROG. In Unlimited and Standard classes, hand-launch would be optional. All motor runs would be limited to ■ two minute run and would require positive proof of motor turn-off, such as dropping ■ pennant ■■ having foldable props. Should you have any suggestions along these lines, forward them to Bob Boucher, c/o Astro Flight, Inc., 13377 Beach Ave., Venice, Calif. 90291.

Bill Johnson and Don Kiryluk launch a Kestrel at the Snowbird event in upstate New York. (Photo by Heyworth)

Here's Joe Modeler a la down-state New York!

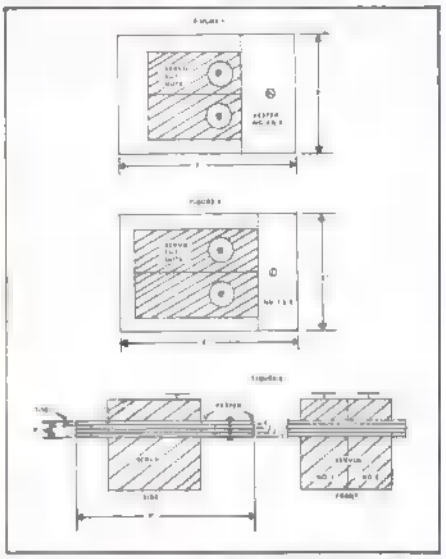


Soaring Event: During the annual National ■■■■ Airplane Meet this August at Lake Charles, Louisiana, there will be ■ promotional soaring event conducted. The competition will consist solely of the AMA Task VI—Duration (Provisional); the rules for this can be found in the right-hand column on page 46 of the 1974-75 rule book. This RC Soaring Meet will be held ■■ Tuesday and Wednesday, August 6 and 7, from one to six p.m. daily. Modelers should not confuse this with the Official Soaring Nats which will be held at Lewis College in Lockport, Illinois, on July 22 through July 24.

The Better Mousetrap (by Cas Pels, **AAM** Midwest Correspondent): Tired of screwing around? Loose screws and damaged servo lugs? Well, here's a new concept in servo trays. In size it's about ■■ small ■■ can be and, best of all, only one screw secures two servos. Great in gliders and very convenient as well. This is how you can make one:

Cut four pieces of 1/16" plywood, 2 x 3", then number them one through four. Make cut-outs in numbers two and four identical. See Figure 1. Then cut numbers one and three as shown in Figure 2. Now refer to Figures 1 and ■ and cut numbers two, three and four on the dotted lines. The small pieces should still be identified ■■ originally numbered.

Cement the larger pieces together, observing sequential order with number one as the base upon which the rest are stacked. The three remaining small parts are also glued together, but not onto the base. This is the removable keeper that locks the servos into place. When both assemblies are dry, slip them together and drill through for that one bolt needed to retain the keeper. Epoxy nut to bottom of base. See Figure 2.



To install servos, remove bolt and slide keeper free. Insert servo lugs into recess at ■■■ end of tray, slip keeper into place and secure with bolt. Voila!

Although these dimensions accommodate Kraft KPS-12 servos, a little stretch of the imagination can produce trays to handle any size servo and should do nicely for the popular brick receiver servo units or any other combination of servos.

West Coast Contests: *(The following information is submitted by Paul Denson, 7902 June Lake Dr., San Diego, Calif. 92104, **AAM**'s new West Coast soaring correspondent.)* The Southern California Council, ■ loosely knit coordinator of soaring activities among the clubs in the area, has made ■ recommendation to set aside a series of dates for contests on the ECSS format. Two of the larger annual contests, the North-South and the Western Regional, have not been scheduled for 1974. It is anticipated that these new contests will fill in the contest calendar. Future contests and dates to be announced.

World's Speed Record Attempt (by Paul Denson): It took three weekends of waiting for the wind to blow to prove a point to ■ hardy group of fliers: if the wind doesn't blow, you don't fly. Following is ■ first hand account of the events to recapture the current Russian speed record of 113.24 mph set by Leonid Aldochine on September 20, 1971. On Saturday, April 6, 1974, Irv Stafford, President of Torrey Pines Gulls arrived at the cliff with his car loaded with timing equipment. Irv designed the timing gear to function with the TV cameras which were focused on the entry gates and extended to the speed trap. Three other switch-operated sets of timing apparatus were set up as a back-up for the TV system. Two members of the club, who are surveyors by profession, laid out the speed trap, set up the altitude sighting mechanisms and established the ideal positioning of the TV cameras. By noon, a number of entrants were on the scene looking seaward, wondering: Where is the wind? The entire afternoon was spent sport flying with light thermal machines. There was not enough lift to get the speed ships off the ground.

Sunday, April 7, was more beautiful than Saturday, so sport flying was again the busi-

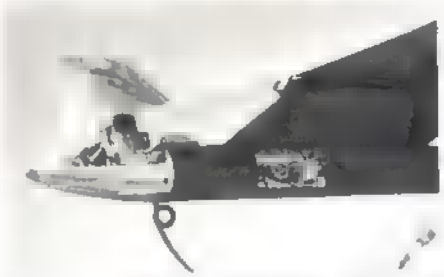
(Continued on page 72)

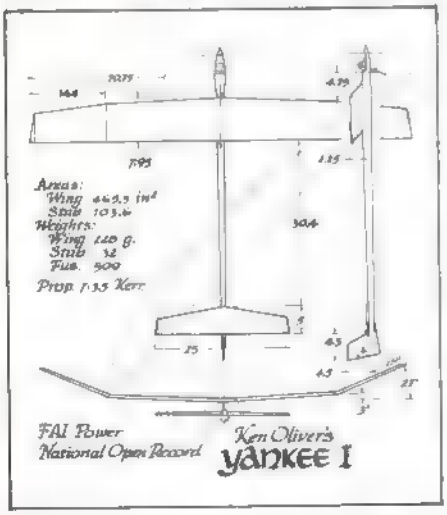
BOB MEUSER ON FF

National Record FAI Power Model: Of all the piston power events in the book, FAI Power is unquestionably the most demanding. Figure $150 per model for hardware and sticks, at least four models per two-year World Championships cycle, the starting gear, thermal detectors, transportation and lodging expenses, chase bikes and it's not surprising that fewer than a hundred participate. Despite severe restrictions on power and wing-area loading, the restriction to straight alcohol-oil fuel, and the banning of tuned exhaust pipes, performance of these models continues to soar. Gadgets abound; any model that doesn't have a device to change the stabilizer incidence angle and rudder setting when the engine cuts is strictly for the Old-Timer events. Gieskieng, Taylor, Thompson and others have tried flapped wings to gain the best of both worlds: ■ thin, flat airfoil for the climb, and a high-lift, undercambered section for the glide. McLaughlin has tried folding props, geared engines, and represented the U.S. at the World Champs with ■ model having a swinging wing.

Some would tamper with the rules and procedures in order to gain increased participation by perhaps lesser men and planes. That would be a travesty. The FAI events are not for everybody. This is our Olympics!

Ken Oliver's FAI Power model, ■ slightly earlier version of the one shown in the drawing, which set a new record. Note the Oliver-manufactured engine pan in the front office.

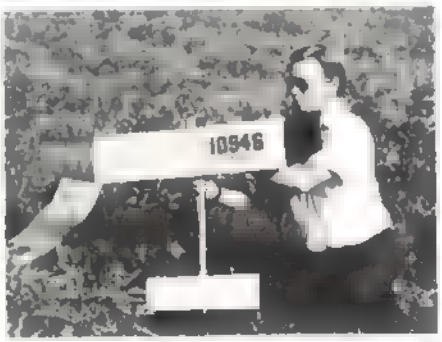




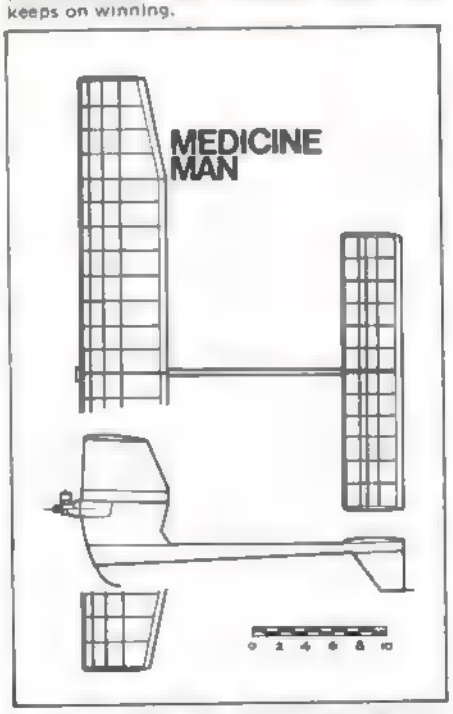
While there are a few clunkers, the level of workmanship and finish on most FAI Power models is high. Among the many who obviously take great pride in the appearance of their models is Ken Oliver of Sacramento, California. His Yankee I, shown in the three-view, has ■ fiberglass fuselage, all sheet-covered wings, and ■ polished cast-aluminum engine pan which Ken markets. (Send a stamped self-addressed envelope to Ken Oliver, 2213 ■ Cejo Circle, Rancho Cordova, Calif. 95670 for particulars.) I ■ sorry to see Ken abandon his high-boom configuration layout, but the ■ series is every bit as beautiful.

And, the ■ model has brought Ken more than his share of trophies. In 1973, Ken got second place at the U.S. Free Flight Championships, first place at the Fresno Annual, several firsts at the Northern Cal FF Council monthlies, first at the once-a-year, all-FAI meet of the Western FF Association, and the AMA National Record early in 1974.

Spotters' Manual: Scheduled for production by Sig whenever the balsa shortage eases, Jim Clem's Medicine Man is well suited for Category II rules. Latest on a long list of popular and successful Clem designs, this 276 square incher weighs in at just under seven ounces, and is ideal for windy-weather flying. Both old Jim and young Grady Turner have drawn blood in competition with this 1971 design. Grady's most recent triumph was a first in Half-A Gas at the King Orange Internats.



Jim Clem out in the weedpatch with his Medicine Man. This "advanced trainer" just keeps on winning.



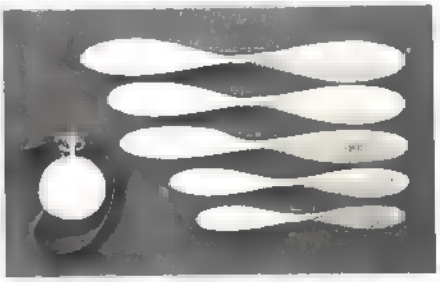
Jim considers the Medicine Man an "advanced trainer." Its construction is simple enough for ■ modeler with limited building experience. Flight trimming is usually simply a matter of balancing the model at the CG location shown ■ the plans. Sometimes a little left rudder tab must be applied, and perhaps a match-book shim under the stab trailing edge. It is usually only ■ matter of three flights before the bird is performing nicely.

Eat your hearts out, those of you who flew Half-A at the King Orange; you were whipped by ■ advanced trainer, and a somewhat overweight one at that!

Model of the Year Awards Announced: For the fifth consecutive year, the National Free Flight Society has identified ten models of outstanding merit. A committee headed by Bill Bogart chose the following models: Bob White's 72-9 Wakefield, winner of the Criterium International Pierre Tribod, and fifth in the World Championships in 1973 (Feb. 1974 **AAM**, p. 20); Paul Crowley's Happy Hooker Nordic Towline Glider, latest and most advanced product of the Detroit school, and ■ member of the U.S. World Champs team; the Rossi 15 engine, most highly developed free flight engine going; the Orbiteer, Dennis Bronco's and Sal Taibi's latest contribution for 049-051 engines (July 1973 **AAM**, p. 94); Mel Schmidt's Shocer 750, largest and most successful in Mel's latest series; ■ Stoll and Paul Crowley's 40-minute-plus indoor microfilm model; Ray Harper's highly developed Max-Flyer outdoor hand-launched glider; Rol Anderson's Roamer Unlimited Rubber model, three-time winner of the Mulvihill Trophy (March 1974 **AAM**, p. 69); Edmund (Ned) Smith's NATS-winning Sunduster Rocket Power model (January 1974 **AAM**, p. 26); and Jack McCracken's tiny gas-powered Sopwith Triplane, hands-down winner of the 1973 NATS.

Stories about each of the models, together with three-views and photos, will appear in the *Report of the 1974 NFFS Symposium*. This is the seventh (holysmoke!) consecutive annual edition of that world-renowned publication. Full-size plans of most of the models are available from the National Free Flight Society.

Paulonia Props Are Back: Yep, the same ones that were in the ads in *Air Trails* in the 1930s. Jim Noonan listed him in his new catalog, ran out of stock, then found a foot-locker full somewhere. Diameters range from six to 11 inches, weights are from 1.5 to 6.6 grams, and prices from 40 cents to a dollar. Pitch-diameter ratios are 0.8 to 0.9. They are carved from some inscrutable oriental wood having a close grain and the density of fir. The blades are thin, and the airfoil has ■ bit of under-



Rare find. Get your original Paulonia props while they last.

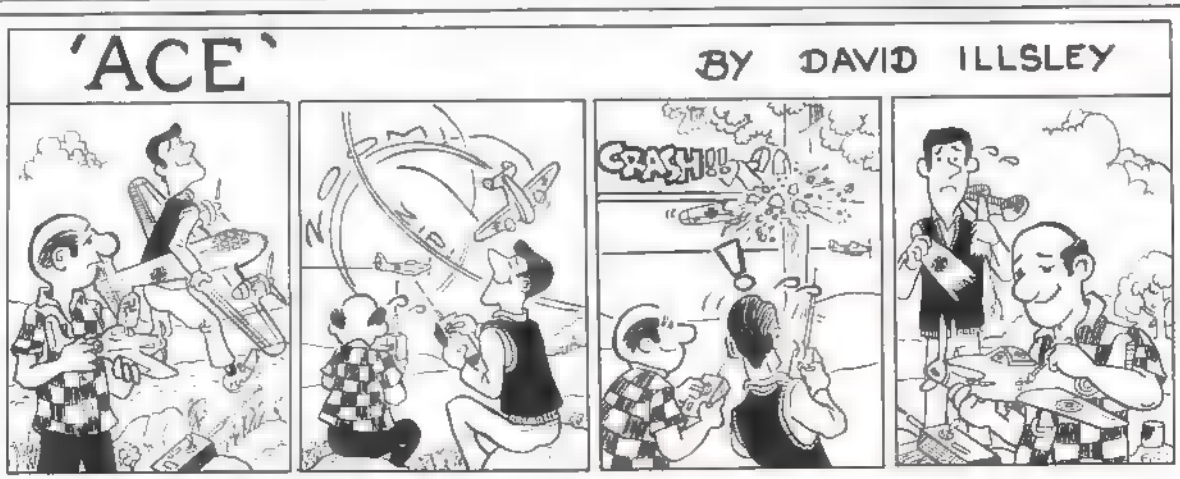
camber. The specimens I measured tracked well, but the pitch angles of the two blades differed by as much as three degrees. That could be corrected by plugging and re-drilling the hole, or by simply bending the propshaft. I suppose there are some people in the world who really enjoy carving props, but others might find these just the ticket for rubber-powered sport, scale, or speed models, or perhaps for CO_2 or electric motor-powered models. These props are among the supplies and plans offered by Oldtimer Models, 7454 W. Thurston Circle, Milwaukee, Wisc. 53218. Twenty-five cents will bring you a 12-page catalog.

String of Pearls: Super-simple, no gadgets, ■ auto-stuff! That ■ the philosophy Bill Chenault had in mind when he started off on the highly successful Pearl series. Drawing from the design concepts of Mel Schmidt and Sal Taibi, Bill decided on a low aspect ratio wing for ease of control, and a thick airfoil for strength.

The Mini-Pearl, first of the Pearl series, is for 049 and 051 engines. The prototype was trimmed in three test flights, and proceeded to take home most of the marbles at a local meet on the following day. The M&P kit soon followed. Among its early glories was first place at the 1971 NATS, in the hands of Don Chancey. Bill Chenault received an NFFS Model Of The Year award for the Mini at the 1973 NATS.

The next Pearl of wisdom was ■ 575 sq. inch version for Supertigre 29 and 35 engines. With that model, Bill collected more trophies

(Continued on page 73)



MARONEY ON RC

(Continued from page 68)

ness of the day. About 3:00 p.m. a winch was set up, and Mark Smith launched his dead black speed glider to an altitude of about 200 feet. Mark dropped off the tow and went directly into a dive, entered the trap and moved through in what seemed to be an effortless manner.

Mark's speed for this attempt was approximately 80 mph. He made two more attempts which produced exactly the same results. Dale Willoughby, once a holder of this speed record, attempted to launch his delta-shaped speedster. However, violent gyrations on the tow produced minor damage and Dale retired for the weekend. The following weekend April 13-14, after experiencing 30 to 40 knot winds during the week, developed into a carbon copy of the first weekend. Not an attempt was made for a record flight.

The third and final weekend seemed as though it would produce satisfactory lift conditions to get the speed planes into the air. By one o'clock Kelly Pike, Ken Kay and Phil Edwards had their planes in the air. Approximately 200 to 300 feet seemed to be the highest altitude these heavy, thin-winged planes were able to attain. Kelly's approach was to come in with a relatively steep dive in order to build up speed, pull out and flash through the trap. He hit his maximum speed of 120 mph on his first attempt. This particular run was from south the north. The wind was blowing from the southwest, hence, he had the additional aid of the wind. His successive tries netted him speeds in the middle to high 90s. Kelly felt that the lift dropped soon after his first flight. The wind continued to blow, but the lift just wasn't there. Not one of the remaining contestants could attain the altitude that Kelly achieved on his first pass. Ken Kay, in his attempt, pointed his plane straight down. It looked as if he was almost in a negative dive. One would think it was ready to fall tail over nose, it made you wonder if the plane could survive the pullout. Ken's speeds were also in the high 90s. Phil Edwards tried two runs and attained speeds in the 80s. While trying to gain altitude, he encountered radio or battery trouble and his plane went into a spin, which continued all the way to the beach. When the plane was brought to the cliff edge we discovered there was no damage to the plane. This speaks well for the type of plane necessary to withstand the rugged pullouts and speeds necessary to break the world's record.

Joe Tschurgi and Ed Hoppe both were able to fly their planes, but were not able to reach the desired altitude for speed record attempts. Dale Willoughby tried to launch into the lift using a hi-start, but the elastic was not strong enough to pull Dale's plane out into the lift. It was battered worse than the previous week.

It looked as if a planned record attempt was doomed to failure. This conquest was planned four months ahead. However, the weather didn't cooperate. In fact, during the time lapse between the three weekends, there were days that these planes could have flown to an altitude of 500 feet. This is sufficient altitude to break the record. Timing gear is available, the cliff is available, personnel to do the work are available. We can plan on the wind enough in advance to give the required 24 hours notice to the AMA. It is apparent that the record can be broken. This was proven by Kelly's one flight. However, the contestant must wait for a weather front to come down the coast, pull in the necessary gear together, get people to run that gear, and make a phone call to AMA. All this must be accomplished within 24 hours if he intends to have the wind necessary to break the record.

To get exclusive use of the Torrey Pines gliderport, it is necessary to have permission from the University of California whose land we must cross, the city of San Diego upon whose land we stand while we fly, the state of California over whose beach we fly and upon which we might accidentally land (crash?), and The Associated Glider Clubs of Southern California who have the lease upon the whole gliderport. We would like to thank these organizations, the San Diego City Lifeguard Service which helped with crowd control, and the UFO Hang Glider Club which stayed away from Torrey in droves for three weekends.

For what it is worth (to others who might have sophisticated equipment for timing events), the major problem with the TV timing system was the unpredictable contrast problems between the small image of the plane and the background. This difference in contrast appearing on the screen is what triggers the time. One solution is to zoom in on the target, but this immediately reduces the overall field of vision. Irv feels that these problems can be solved. However, is this complex system really necessary? During the three weekends of trials, it was repeatedly noted that the times turned in by the hand-held button-pushing human timers were closely correlated to those turned in by the TV systems. We think three sets of humans with hand-held switches connected to electronic timers would be far superior to the sophisticated TV system, and much less expensive.

The Inglefinger: The Inglefinger was designed by Paul Lagan, the many time New Zealand Champion. This glider is a highly successful model. The Inglefinger has a 100" wingspan. Full-size plans are available for $2.00 each and may be obtained from Paul whose address is: 8 Bermuda Drive, Christchurch 4, New Zealand.

Paul Lagan, from New Zealand, has plans for his Inglefinger available.

(Continued on page 92)

MEUSER ON FF

(Continued from page 69)

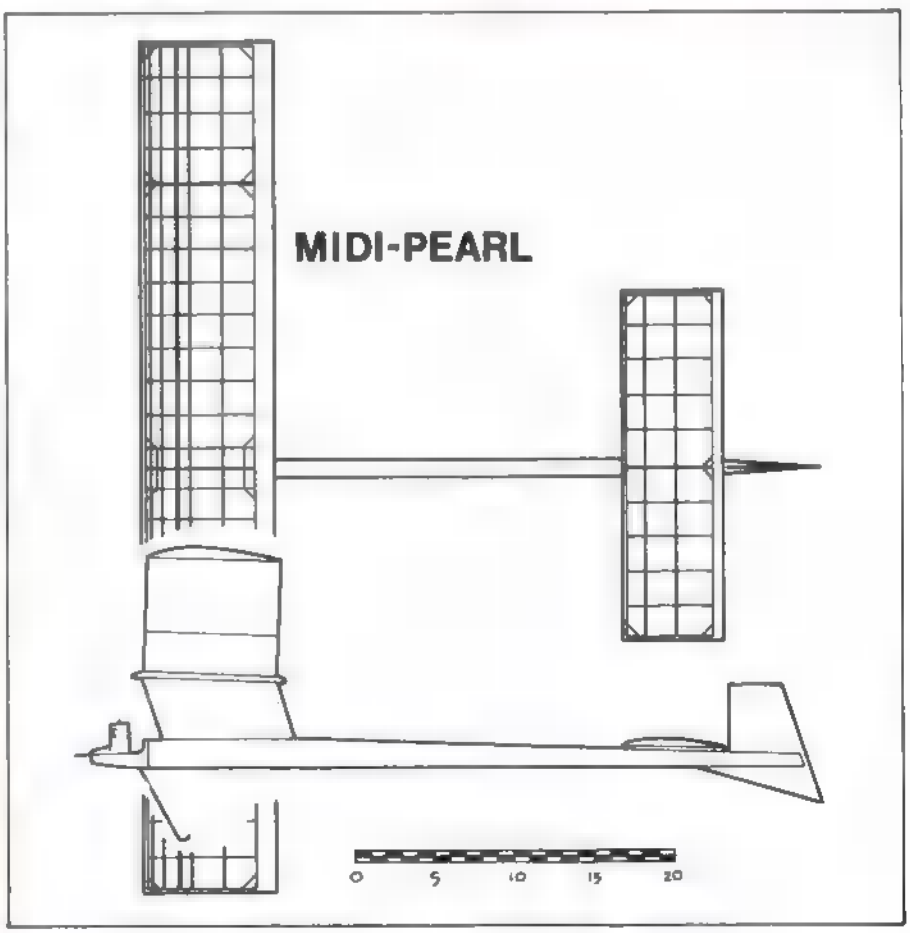
in one season than with any model he has ever flown.

Bill had a pair of Aldrich-tuned Supertigres, 19 and 23, and decided to try a Pearl with about 430 sq. inch wing area for Classes A and B. But, noticing that such a model was pretty close to FAI specs, Bill increased the span a bit.

Upon completion of the prototype, Chenault installed a sick Supertigre 15, and what turned out to be a very sick OT timer. Chasing the model on its third flight, Chenault ran out of freeway after 16 miles and 28 minutes, and the proto-Midi was lost forever. The second Midi accompanied Bill to the 1972 NATS, just so Bill would have something to test fly and trim out during his spare time. Bill stuck a hot Rossi 15 in its nose. Despite temporarily losing it after an hour-long chase—stuck timer again—he took fourth place in FAI Power. Since that time, this docile "trainer" has compiled an enviable

(Continued on page 94)

Bill Chenault with his Rossi 15 powered Midi-Pearl at the 1972 NATS.



ON THE SCENE

(Continued from page 14)

trees which surrounded the field, an occurrence which tended to happen throughout the contest. After three rounds, third place was won by E. Lozano with his beautiful metallic blue Minnow. At this point, Luis Castaneda and Manuel Sierra [redacted] tied for first place. In the first attempt at a fly-off there was a spectacular mid-air, as the airplanes lifted off simultaneously.

In the second fly-off, Manuel won with his backup airplane in a very close race. Both were flying Minnows with K&B Schneurle's (a standard?). Best unofficial time was 1:40 by Joaquin Alba, with a K&B-powered Ricky Rat. At Mexico City's 7400-foot altitude, the higher aspect ratio wings definitely worked best. The Mexicans have pretty much given up flying the older style DARAs, Sharks, etc.

With the wrap-up of Formula I, the FAI racing was started. There were 10 FAI entrants including Joaquin Alba's beautiful Phony Folkerts—painted to look like Jonathan Livingston Seagull. One heat of FAI was completed on Saturday. A few crashes, and a couple of planes in the top of a large tree at the end of the runway, added some spice to the day.

Our first flight almost ended in disaster before it even got started. On the line with a one-minute starting time, our HP backfired for the first time in memory and blew everything off. When you

KAVAN

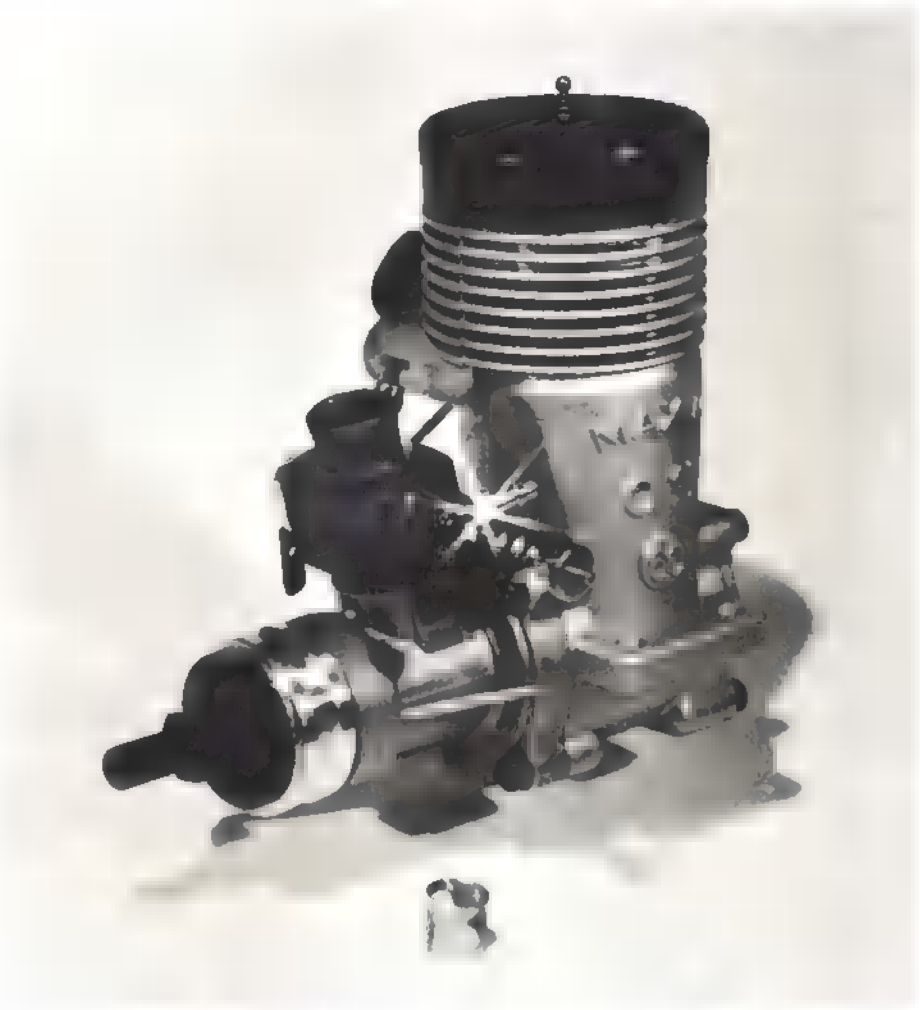
JetRanger

1st Class!

$420.00

KAVAN HELICOPTERCRAFT INC. 1324 E. Rowland Ave. South Bay, [illegible]

OS Black Head
Advertisement



CHROME SLEEVE
FOR A LONG LIFE

MORE SLEEVE
PORTING FOR
MORE POWER

O. S. BLACK HEAD .60
MORE PORTING—CHROME LINER

The OS factory in Osaka, Japan has for the last few years dedicated most of their research to the development of the OS Wankel engine. Recently they have turned their attention back to piston engines. A few months ago it was our pleasure to introduce the new Schnuerle ported OS Max 40SR. The first of these engines did rather well coming in second in rat race at the King Orange. Considering that it was a one-of-a-kind entry against a large field—over 25—it's performance was ■■ outstanding success.

The writer of this ad, John Maloney, recently returned from Japan and I brought back ■ sample of the OS Black Head 60. This is the engine that appears in the above photograph. The new OS Black Head 60 features ■ chrome sleeve which is the outstanding change in the engine. In addition to this, there are more porting windows in the sleeve than on the OS Gold Head. Also, the carburetor is equipped with an insert. The insert can be seen in the foreground of the photograph. The insert is intended for use if the model builder elects to run without pressure. If, on the other hand, the model builder is using pressure (probably from the muffler), then the insert can be omitted to give ■ larger venturi diameter. Tests at the OS factory on no nitro fuel indicated a pick-up of about 500 rpms by the elimination of the insert and the use of pressure. The engine is now done up handsomely being put together with socket head screws, both on the head, front plate, and back plate. The new carburetor supports ■ much classier adjustable stop collet than did the older carburetor. The new anonodized Black Head is a touch of class.

One other bit of good news is that the price will remain the same—at least for the time being at $74.95.

The companion muffler for the OS Black Head is an OS #704 muffler retailing for $10.95.

NEW IMPROVED
CARBURETOR

WORLD engines

8960 ROSSASH AVE., CINCINNATI, OHIO 45236 • TELEPHONE (513) 793-5900 • INTERNATIONAL TELEX 214 557

A CONSOLIDATED FOODS COMPANY • RESPONSIVE TO CONSUMER NEEDS

have borrowed a flight box (and it doesn't have a prop wrench), and you turn to the next flier on the line and realize he doesn't understand ■ word you are saying, you are in trouble. We have heard the ensuing 60 seconds described as a silent movie (run at top speed) with much scurrying around and flailing of arms. By a combination of good luck, sign language, and lots of help, we got into the air in time.

By the time the flight was over, a tremendous case of nerves had set in. We both needed support getting back to the pit area. With one first place heat to our credit, we were more than glad to call it a day—at least as far as flying was concerned. A late evening get-together with friends was our Mexico method of keeping in flying trim for the next day's racing.

Sunday morning dawned much too early, but we all made ■ valiant effort and arrived at the field in varying degrees of alertness. The FAI racing was completed by noon (in spite of us) and we found our HP-powered Phony Folkerts in first place; with Joaquin Alba and Marcial Davila tied for second. Joaquin won the exciting fly-off, passing Marcial and his Korpi Pelican on about the eighth lap. Unofficially, the best FAI time was a 1:59, by our Folkerts. The one-two placing of the Phony Folkerts design* gave us all the excuse we needed for ■ fine celebration with the Alba's that evening.

The Open Race on Sunday afternoon was just that. Wide open and very exciting. From our observations the previous year, and after much thought, we arrived with ■■ airplane which was a combination of a 1/4 Midget, Formula I experience, and lots of prayer. Anytime you have ■ 3-lb., 340 sq. inch plane, powered by an OPS 40, you need lots of the latter. Actually, at Mexico City's altitude, this plane flew like ■ good Formula I. However, we wouldn't recommend a plane like this at sea level.

It was quite gratifying to find out that a plane specifically designed for Mexico's unique characteristics, with the limitations (or lack of) set down in the rules of the Open Event, could do so well. In the early flight testing at home, there were some doubts. Our ultimate decision to name the plane the Streaker showed some optimism.

Out of 30 entries, perhaps 20 of them were in serious contention, with the remainder adding greatly to the fun. After the dust had settled and the heats were completed, two of us had a perfect string of firsts. Both E. Lozano's airplane and our Streaker were on 53.5 MHz, so a flight against the clock was necessary. A fly-off between Marcial Davila and R. Martinez was also required to decide third place. Marcial won this, flying his FAI Pelican with ■ lot of nitro.

The afternoon was interrupted for about an hour, at this point, as a thunderstorm (with much wind and dust) moved through. The final flight showed the Streaker, with a comfortable speed margin, giving us first place; with ■ well

deserved second place going to Senor Lozano. The best time (unofficial) was about 1:38 for the Streaker.

After the beautiful trophies were presented, there was one more round of parties, to celebrate the end of a marvelous race. Partings were very difficult, but they were eased somewhat by assurances that we will be seeing our friends again soon. It looks like Mexico City at Easter has become a family tradition for us.

**(The Phony Folkerts appeared as an AAM construction feature in the July issue—Ed.)*

ASTRO-JEFF

(Continued from page 22)

with spar box. Let the above assembly dry thoroughly, then wrap with nylon thread, per plan.

Pin down and glue bottom sheeting, cap strips and stringers. Sand spar box assembly square at the root rib and glue to bottom sheeting. Glue on the false leading edge. Notch the ribs to accept the stringers and glue ribs 1 through 11, front and rear, along with 12B. Cut a strip from 1/8" hard balsa 18¼" long for horizontal webbing (check height between spars on ribs 12 and 21 for dimensions). Cut these pieces with excess length, and glue webbing and ribs 12 to 21B in place. Glue in PB1, PB2, and PB3. Cut 22B to fit and tilt, per plan. Add TE webbing (grain is horizontal), gussets and top stringers. Slide WSB into the spar box and glue in the root rib. Add spoiler linkage and Pro-rod. The inner portion of the Pro-rod should be cut off to a known dimension, at the root rib, for reference. Use the plan as a guide. When making SW (spoiler wire), be sure that there is enough clearance in the Ace Swing-in-Keeper to provide a swiveling effect with the keeper. If using 1/16 wire, drill keeper with a No. 50 (.070) drill. Glue in the screw eye and tubing reinforcements, and epoxy the 5/32" OD brass tubing.

Sand a bevel on the underside of the top rear TE and glue. Frame the spoiler opening with balsa, per plan. Shape the top of the front false LE, and glue all top sheeting and cap strips.

Spoiler Construction: Cut ply to fit opening, with 1/32" clearance on back and two sides. Lay out holes per plan, stack ply top to top, clamp to board and drill holes. Use Hobbypoxy 1 for gluing spars, while they are clamped to a rigid surface. I recommend a combination square ruler. Epoxy in place ribs S1, S2, linkage lever rib and spring return rib. Clamp ribs with clothes pins.

The spoiler has the curvature of the wing, so place the spoiler ribs (per plan) for right and left, to avoid interference with balsa ribs. Insert 1/8" ID brass eyelet and crimp over in the linkage lever, as shown in enlarged view S. Fit spoiler in wing opening, and notch balsa ribs to miss spoiler spars.

Outer Wing Section: Pin bottom sheeting and TE to plan. Glue cap strips and bottom spar in place. Mark completed inner wing panel for the 36" polyhedral point, as shown on plan. Block up 3¼" at this point, and glue PB1, PB2 and PB3 to spar and bottoming sheeting, making sure to bend PB1 as shown. Glue in false LE and ribs. Place washout shim at TE, glue in top spar, and three thicknesses of vertical webbing. Also glue in the TE horizontal webbing and gussets. Sand the top of the false LE, and glue on the top sheeting, TE (bevel underside of TE) and cap strips. Sand LE and glue on the hard balsa LE. Sand the wing tip and glue on the tip blocks. Shape the LE and sand the complete wing. Use MonoKote or equivalent for spoiler hinge.

Make SS (spoiler swivel) and file a screw, so that the screw clamps SW, but has clearance for the brass eyelet. Add spring and adjust.

Balsa Fuselage Construction: Begin by cutting out all bulkheads B1 through B12, using templates as shown on plans. Using 1/8" Sig Lite-Ply, except B7, which is 1/4" ply. Bulkheads B3, B4 and B5 include shaded portion for initial build-up on the jig. Mark a vertical centerline on the bulkheads, and drill out the two holes for attaching to its corresponding jig piece (see charts for dimensions). Make jig from any grade commercial plywood, making sure that the vertical members J1 through J8 are 5/8" wide. Mark the vertical and horizontal centerlines in the J pieces, and lay out the top hole (see chart for dimensions).

Drill a clearance hole, and assemble the bulkhead with bolt and nut, lining up the two matching vertical centerlines. Tighten the bolt, clamp bulkhead to jig piece and drill bottom clearance hole (using bulkhead as a jig). Repeat procedure for all eight bulkheads and jig pieces. Disassemble bulkheads. Mark jig base with fuselage centerline. Glue and nail jig together, making sure that the jig is square and that the centerlines are aligned. Use plan for spacing J1 through J8, making sure that the angle of J7 is maintained. This bulkhead sets up the incidence in the wing. Let the jig dry.

Cut the 3/4" triangular longerons with a razor saw in two directions (perpendicular to its length, as shown on plan) so that it will bend to the contour. Make right and left longerons. Splice and glue the 3/8", 1/2" and 3/4" triangular longerons, leaving the front long (trim it later). Leave the right rear bottom longer for the angle at the rear. Cut out B22-L, B22-R, B13 and RTG (gauge). Glue B22-L and B22-R to its 3/8" triangular stock (the bottom is flush). Trim the 3/8" and 1/2" triangular stock to accept B12, B13 and RTG. Glue B10, B11 and B12 to the plan view, and tack-glue RTG. Cut out

B15 and glue B13 (with B15) to B22-R and B22-L.

Place jig on plan view, lining up centerline. Anchor it to the building board. Assemble bulkheads B1 through B8 to jig, with screws and nuts. Glue in the 3/16 x 3/16" front stringers. Cut out and glue B19 in place, and glue 3/8" triangular stock at the front. Make aluminum clamps and epoxy FSB to B7. Clamp should be inside the outer edge of B7 by at least 1/8", leaving room for RB1. Check alignment by inserting WSB.

Place jig blocks at the rear of the fuselage and at B10 (see side view for dimensions). Glue the bottom assembled longerons to B7 and B8 (hold in place with rubber bands) and place on the two jig blocks. Glue the top, right and left longerons (trim like the bottom ones) to B13, B12, B11 and B10 (clamp around with rubber bands). Glue B9 and clamp. So far, the triangular stock should be flush with the bulkheads on all sides. Continue gluing and clamping the triangular stock to the bulkheads, while fitting it at B1. Trim the inside edge, per section B1. Cut out and glue B17. Glue 3/16 ■ 3/8" spruce to B8. Glue 1/32" sheet filler in front of B22-R/B22-L, and sand to plan taper when dry. Do not remove from jig.

Cut out, add taper and glue S1-L/S1-R (the taper goes outside) to B1 through B8 and the 3/4" longerons. Cut out, add taper and glue S4-L/S4-R to B17, B6, B7, ■■ and the top 3/4" longerons.

Add the elevator Nyrod, fitting it at the rear and through B13. This is ■ good time to think about the antenna too. You can epoxy a 3/16" OD Nylaflow tubing the full antenna length, while putting the actual antenna inside a 1/8 OD Nylaflow tubing. Tie a knot in the antenna wire end and slip this through the other tubing.

Cut out S2-L/S2-R, the two pieces of S5, S3-L/S3-R and the two pieces of S6 per template shown and glue to jigged fuselage in the sequence noted above. Cut out RB1s along with the wing root ribs, as shown on plan sheet two. Drill corresponding holes, while stacking these four pieces to insure proper alignment. Cut out, drill hole and epoxy the 1/2 ■ 3/4 x 5/8" pine block used for the spoiler, ■■ shown on plan sheet one. Fill in the space between S6 and RB1 with 1/8" balsa sheet, fit and glue.

Sand the rear of the fuselage. Remove RTG, cut out B14 and glue. Glue the four pieces of 1/16" ply to B22-L/B22-R and B14. Drill a 1/8" hole for ECHP (see section K-K). Fabricate ECHP and assemble. Mark hole location and drill and tap for 2-56 screw. Cut out and glue B16 and LE of fin.

Saw the upper end of J1 to J8 and remove the top of the jig. Remove all screws holding the bulkheads to the jig. Remove fuselage by lifting vertically.

Cut a piece of 1/4 x 1/2" to the required length for anchoring your towhook. Add blind nuts and glue block to B6/B7.

Cut out SB1, ST1, SB2, ST2, SB3, and ST3 per plan template, and glue to fuselage in sequence noted above. Glue in the 1/4" gusset and 1/16" sheet on vertical fin. Add extra 1/16" sheet at the base of the fin for a fillet (see section H-H).

Fill in space between S3-L/R and RB1 with 1/8" balsa sheet, fit and glue. Glue balsa blocks in the space at the front and rear of RB1 and the fuselage. Glue 1/8" balsa on the top side of nose. Sand the canopy opening and glue B21, B20 and B18. Drill hole in B1/B20 and epoxy tubing in place. Hollow out the pine nose block (can be made in two pieces and glued) and shape to outline of B1 section prior to gluing.

Get ■ big basket and start shaving. I used a small X-acto razor plane and very course sandpaper block, while keeping ■■ eye on the various sections B1 through B12. You can see the different sheets and triangular stock change with the eye. It is really fun now. For the fillets, use sandpaper on ■ dowel. The larger the dowel, the larger the fillet.

Cut out the towhook opening and fiberglass with Hobbypoxy 1 or ■ and three-oz. cloth. Remove shaded area from B3, B4 and B5 by sawing. Make canopy, radio installation, and pushrods and you're ready to apply the finish. I'll leave the rest to your preference.

Finish: The finishing method used was MonoKote on all flying surfaces, and the fiberglass fuselage was painted with Ditzler Acyrlic Lacquer.

FLYING

Before you go to the field, check all surfaces for warps, and assemble the rudder, stabs and wings. Check all controls for proper function and make sure that the linkages are not sloppy. Add nose weight until the model balances at the CG shown. Make sure that you have 1½° down elevator when the transmitter is at neutral and the trim is centered. Place the towhook approximately 3/4" forward of the CG.

Disassemble the model, pack up and head for the field. Before flying, range check the equipment again. You have made a new installation, so don't rush it—make sure to try your controls again! Oh yes, do you have the frequency pin? If there is a slight breeze, don't use a hi-start for the first flight, since you have not optimized the towhook position. If you have a strong arm, give it a strong throw and check it out. When you're satisfied, hook it up to the winch line, point the nose up about 30°, tighten the line and keep standing on the winch to obtain sufficient height before pulsing the winch and release. Get the model to fly level hands-off and see what it's doing by checking right and left turns. Smooth out the turns and you're on your way. Make long approaches on the initial landings, until you get the feel of it. Make several flights, moving the towhook back to a comfortable towing position. The Astro-Jeff will really tow up, so work at it. I would recommend that when you're ready to try the spoilers, you don't start at a low altitude. Instead, start up 25 to 30 feet, then put the spoilers up slowly and be ready to apply up elevator. Play with coordinating the spoiler with up elevator, and the spots will come with practice. If you have any questions or comments, contact me through **AAM**.

PACER

(Continued from page 29)

are contact-glued in exact position, you are almost there. Note the full length rudder post, which is installed in one piece—then cut through for the stab to slide in place. Make sure that the dorsal back and fin are true to the centerline. The original has a side mounted engine for a cleaner profile. Make sure the needle valve faces UP! This can be done easily by simply loosening the venturi and reversing the needle valve assembly.

Tail: Use reasonably stiff balsa, and cover top and bottom to prevent warps.

That's about it. Now there's nothing more to do except wait for the first guy to come up with a 60 version. Good luck, Pioneers!

The author expresses a large thanks to Tom Runge—who contributed so heavily to this production.

FOKKER D. VIII

(Continued from page 33)

When placed on top of the basic Fokker fuselage, this thick airfoil with its large nose radius gave high lift, and reduced the bugaboo of stall and spin. It also provided good visibility in what was an enjoyable machine to operate. And even with only 110 horses, the V.26 was a speedy little devil with lots of potential.

When the Second Fighter Competitions opened in May 1918, the Fokker Company had 10 airplanes in the running. Of the 10, some were D.VII variants. Of the prototypes submitted, three were parasol wing monoplanes entered under factory designations V.26 (110 hp Oberursel UR .II), V.27 (195 hp Benz Bz. IIIb) and V.28 (145 hp Oberursel UR .III) Other than the different engines and their installation, the three prototypes were basically the same. However, engines on the V.27 and V.28 were still in the experimental stage and not yet approved for operational use.

By June 1918, the V.26 had won a contract, and was officially adopted into the military as Fok. E.V. The Fokker Works at Schwerin were given an order for 400 machines providing that, following a two-month organizational period (to get production set up), they could deliver 80 aircraft per month. (The war wasn't going quite as per "the plan." Not only could they deliver 80 a month, Fokker promised, but

WIN $25

far, we've discovered ways to Quik Stik. We'll pay $25 for the best new use submitted (also $15 for second place and $10 for third. Here are our uses:

#1: Conventional adhesive sticks to tissue, silk, rayon, nylon, cotton, balsa, leather, etc.

#2: It's iron on. Can be re-heated again and again. Mistakes be corrected. Also solvent activated.

#3: Speedy primer or filler. Seals pores with half as many coats.

#4: Makes incredible final coat. Crystal clear, super gloss, scuff & scratch proof. Goes over all paints.

See your dealer first. If unavailable, order from Coverite, 119 York Rd., Jenkintown, Pa. 19046. USA. $2.50 per ½ pint; $3.95 per pint. postage paid USA.

he'd also see to it that they'd get the first batch in a couple of weeks.

Well, Fokker employees worked like a house a-fire and, by the end of July, 20 of the E. Vs were rushed to the front. The nifty little monoplane quickly passed acceptance tests, and by August 7th was deployed into two different fighter wings.

After only a few days of operational use, a pilot was fatally injured when his E. V experienced wing failure, and crashed. Two days later another E. V shed its wings. Then within another few days, yet a third aircraft suffered the same fate. Pilots rapidly became disenchanted, and weren't at all unhappy when the E. V was grounded. Acceptance tests on further E. Vs were postponed, until an accident board could determine what the devil was going on.

By August 24th, all the available wreckage had been gathered. The debris, along with some factory-fresh wings, was subjected to close scrutiny, and tested to destruction. The evidence piled up.

The upshot was that, while the prototypes had exceeded structural requirements, manufacture of the production models had been, in a word, atrocious. The wing had not at all been built according to the original; the resemblance between the E. V and the V.26 was external. And, not only had poor material been used, but workmanship was horrendous, factory inspection nonexistent, and even the government inspectors had been asleep at the switch. All in all, it's a wonder criminal proceedings weren't brought against the whole kaboodle.

By September 2nd, in addition to his other duties, the whole production department had been placed under Platz' control, and things brought up to a proper standard. By September 24th, production was resumed. This time, the airplane was produced as originally designed, with some added "margin", in certain areas.

The airplanes that came off the line were redesignated Fokker D. VIII. By this time, an order had been issued that all single-seat fighters, regardless of the number of wings, were to be placed into a single category, D. This eliminated the old Eindecker, Doppledecker, Dridecker categories. Now "D" simply meant single-seat fighter. The Fokker E. Vs having somewhat of a stigma attached to them, by hook or crook, Tony Fokker lucked out.

The E. Vs that had been grounded were beefed up and redesignated D. VIII. By October 24th, the parasol wing fighter was in front line service where it soon became known as The Flying Razor Blade by Allied pilots. Production at Schwerin was speeded up and by November 11th, 381 of the fighters had been built. Had the war been prolonged, undoubtedly, they would have superceded the D. VII in the "fabulous" class.

FOOTNOTES

1. An "in-house" designation for experimental aircraft.

2. The seventh biplane fighter, built by Fokker, to be accepted into the military.

3. The angle of incidence had been determined, previously, by ■ primitive, though effective, method. A test monoplane, fitted with ■ wing in which the incidence could be changed during flight, was flown by Fokker until the angle of attack "felt" right. It worked out that the geometric incidence of the mean camber line was 3 degrees, 50 minutes. And they pretty much stuck with that in subsequent airplanes.

4. For further readings on this and other Fokker data, see: A.R. Weyl, *Fokker: The Creative Years* (London: Putnam and Co., Ltd 1965); Henri Hegener, *Fokker—The Man and the Aircraft* (CA: Aero Publishers, Inc., 1961); J.M. Bruce, "The Fokker D. VIII" (Profile Publications No. 67); Air Service Information Circular (Vol. III, No. 288) October 1, 1921- , "Official Performance Test of Fokker Monoplane D-VIII Equipped With 110 H.P. Oberursel Engine."

TWELVE-YEAR-OLD CHAMP

(Continued from page 18)

I couldn't wait for warmer weather to fly the Astro-Jeff, but managed to till the latter part of March. It sure flew well, and I was hoping dad wouldn't take it away from me. I practiced occasionally, while having a full Little League baseball schedule.

I'll never forget the first Sunday of May, 1973. After our club contest, I let dad fly the Astro-Jeff, since he wanted to try for his 5/8 mile goal and return for LSF Level II. He tried to get it by staying ■ the field. Well, the plane was way out there and he lost radio contact . . .and then it crashed. Luckily we found it, ■ mile and a half away and, when I saw it, I wanted to cry. The fuselage was in two pieces and both outer wing panels were broken! I know how dad must have felt, and the first thing I told him was that I could still fly the Olympic at the Nationals.

One day, when I ■ riding with dad to Joe's Hobby Shop, I asked him whether there was going to be a Junior Team at the Nationals, just like the men have. He said he hadn't even thought of it, but would certainly bring it up at the next club meeting. Months later, he told me that Chicago would have a Junior Team, and I certainly wanted to make it. He gave me the good news, after their July meeting, that I was selected for the Junior Team, along with Jason Josaites and Norm Materyn.

Dad rebuilt my Astro-Jeff and it was completed the first week of July. This worked out fine, since that was when our baseball season ended. Two weeks before the Nationals, I practiced three nights a week plus weekends. He and I worked out a plan. All we flew was Two Minute Precision, using a runway, along with a set pattern.

At the 1973 Nationals, the first event was Two Minute Precision, and the practice for this event really paid off. I had a perfect flight (two minutes and 100 spot) and ended up, on Monday's Two Minute Precision event, having the only perfect flight. I guess that was my real break; no one else had a perfect flight, but there were a lot more flights to be flown. When I went up for my first Ten Minute Duration, not many fliers were getting maxes, so I just went straight out off the towline and I found some lift. I got over nine minutes, plus the landing points.

On my last flight (Ten Minute Duration), I maxed, but missed the landing spot. I landed short of the far markers. From where I was standing, it sure looked like I would have made it. I really thought the one missed landing would hurt my chances of getting that Junior Trophy.

I was really happy when they called my name for the Best Junior Award. Man-Oh-Man, when they called my name as the Grand Champion, it was the happiest day of my life. All I could see was the Schwinn Bicycle that I had won, and I could not wait to get home and tell my mom, my sisters and my buddies.

I'd like to thank all the guys in our club for the help they have given me in learning to fly and all the people at the Nationals that helped me in winning the Grand Championship Award.

I completed my levels in LSF: Level I, Sept. 1972; Level II, July 1973; and Level III on Oct. 21, 1973. I am currently working on Level IV, having completed an hour thermal flight at Cumberland, Md., this past November.

SAAB J21-A

(Continued from page 46)

Then the strips were laid in place along the canopy seams.

Install rudders, elevator and ailerons. Refer to the plan for the rudder tie-rod detail. All horns are on the inside of the booms.

The radio installation is a bit cramped with three servos in the wing well, and the motor servo in the space between F-2 and F-3. The receiver is sandwiched in foam between F-1 and F-2, and the battery fits up in the nose under the front hatch.

The nose wheel steering rod has a Kwik-Link where it attaches to the steering arm, which must be disconnected to remove the wing. Also mount the charging jack in a readily accessible spot.

Run the antenna wire under the center nose section of the wing, out to a landing leg, and back to one of the sub fins—keep it away from the prop.

Install the tank as shown, and mount the landing gear. The model was completed before the new scale plastic gear sections were available, so Sullivan gears were used. They are quite a nice unit, but the new ones would look equally good. The gear well covers were made from 1/64" ply and steamed to a curve.

The nose landing light was made from a three-volt pea bulb, and the reflector was a cone of silver paper. Use Tatone instrument parts to make the rim and glass. The boom lights were "borrowed" from my son's assortment of plastic car parts.

Now for flying. To insure success, certain prerequisites are required: (1) Dress sharp, (2) have your hair styled correctly, (3) line the chicks up along the runway, (4) and be very efficient in starting the engine and checking the controls.

Then hand the transmitter to the grubbiest guy on the field (who just happens to be the best flier) and, as he puts the little ship through its paces, casually saunter over to the spectators and keep up a running commentary. Throw in a few expert words like "double Immelman," which is easy to say in the clear, crisp air at the local field, but nearly impossible in the smoke haze at the local pub! Set a date for later that evening with the most enthralled spectator, and after the blond, brunette and red-haired powder puffs have disappeared in a roar of double carbs, grab the box back and fly like you usually do—giant left hand circles with maybe one semi-controlled loop and a side-splitting roll!

Only kidding, sport. The Saab is a pleasure to fly and, except for an out-of-trim condition easily corrected with ailerons, the maiden flight was a real joy. One caution though. Keep it close to you. Those drab colors look good in the judging circle, but they are a real eye-buster up high.

AAM WEATHERMASTER

(Continued from page 49)

the servo shaft can extend through the center. Now bolt in your slave selsen servo, install the meter, the barometer, the 115/6-24 volt AC transformer and the momentary-on AC switch.

Use "wire nuts" from the hardware store to install the momentary-on switch in series with the transformer pri-

Last month's AAM showed how to make this weather vane and wind indicator. This month's installment is on the completed indoor gadgetry.

mary lead and power cord ■ shown. You must not allow the transformer to deliver power to the selsen servos continuously, since the 60 cycle current causes some heat build-up in the 400 cycle motors. Use a line switch which is spring loaded "off."

On your selsen servos, there are five terminals. All the terminals of both servos should match (I told you to write them down!). For example: S-1, S-2, S-3 plus R-1 and R-2 from the roof mounted master servo should be fastened to the corresponding terminals of the slave servo. Two of the five terminals will be lettered or numbered differently from the other three (here it's R-1 and R-2). These two terminals provide power for both servos, and should also be tied to the low voltage leads of the AC power transformer.

Five leads of the seven-wire cable are now connected. The two remaining leads should be fastened to the terminals of the wind speed milliampmeter. Ground the shielding of the cable to your metal case with a suitable clamp. If your box is wood, ground the shielding to the transformer: this will put all AC components at ground potential, for safety.

Plug the weather vane unit into its rooftop socket, carefully sliding the flat brass "rotator" into the slotted dowel. Pick ■ calm time of day. Now turn on the power to the servos and wait ■ instant for the servos to come into sync. Press a clock hand (which you can pick up inexpensively from many watch repair shops) tightly onto the servo shaft.

It should point in the same compass direction on the wind ■ as the wind vane on the roof. You'll need ■ helper and ■ compass, unless true compass direction is known. Turn off the power, and either wait for some breeze, or have someone spin the weather vane's prop in the prop direction to be sure your meter is hooked up correctly. If the needle doesn't rise when the prop is spinning, reverse the meter leads inside the case. Place your "sealed" pot in the meter circuit in the same manner (series or parallel) ■ it was during the calibration process. If you have access to an accurate ohmmeter, you might measure the resistance of your calibrated pot, and substitute ■ fixed resistor of this value in the final circuit.

Mount your instrument panel on the wall with screws or nails and enjoy an accurate, safe, attractive, and inexpensive weather station which has all the features of commercial units selling for several hundred dollars. Figuring my research and parts-hunting time at $2.50/hour and including all parts, I find mine cost less than $1,800! Seriously, though, the price of the whole rig should be well under $25, and will provide many hours of informative pleasure. More importantly it will save you the time and expense of wasted trips to the field, should unsuitable flying weather be imminent.

Happy weather watching!

EDITORIAL

(Continued from page 4)

are incapable of having an aircraft which will do snap maneuvers, as well as smooth maneuvers.

The new pattern requires ■ hell of a lot more power. Planes will also need a higher roll rate, so you adjust your ailerons. All that does, in effect, is require all the gimmicks that they put on their transmitters to provide a high and a low roll rate. I can see the advantages of ■ variable roll rate device. Gadgets of that type may become necessary, but I don't particularly approve of them.

Whitley: You can make a lighter airplane, with more wing area. If you're going to fly the same airplane you've been flying, you're going to have a great big pattern. You won't execute it very well in ■ crosswind. What a lot of us

AAM Sudden Service Plans

FULL-SIZE PLANS—SHIPPED FIRST CLASS MAIL WITHIN 48 HOURS—NO EXTRA CHARGE!

THIS MONTH'S PLANS

0841/ASTRO JEFF—RC Glider. Winner of the 1973 SOAR Nats, this 14' soarer has built-up wings, with spoilers. Three extra large plan sheets (almost 45 sq. ft.) illustrate profuse construction details. Either a fiberglass or balsa fuse can be built. Three function radio. Our best sailplane design. $16.95.

0842/PACER—049-powered Pattern ship. Capable of good pattern performance, this design, by Owen Kampen, uses Ace foam wings. The Pacer has enough maneuverability to qualify as a small field ship for even the most descriminating filer. This sleek low-winger has all the good looks of a pattern design, too. Two-function radios. Tee Dee 049-051 engines. $2.50.

0843/SAAB—Stand-Off Scale. This WWII Swedish fighter is a pusher, with twin tail booms. Of all balsa construction, the plane can be built in two sizes, for either a 35 or 45 engine. A good choice for getting started in Stand-Off Scale. Four function equipment. Two plan sheets. $4.95.

0741/EL TIGRE—AMA Pattern Ship. A pronounced vertical fin gives the fuselage a streamlined "flaired" look. Semi-mid-wing (foam cores commercially available) is based on Jim Kirkland's Triton for smooth, reliable maneuvers. 4-5 function radio, with retracts. 60 engine. $5.00.

0742/AVENGER—CL competition stunter for AMA aerobatic schedule. High aspect ratio wing and stab. Extended ventral fin on an extra-thin fuse adds to the model's contemporary sleek looks. A highly refined, contest-caliber design. 35 power, with muffler. $4.00.

0743/PHONY FOLKERTS RETRACTS—Plans show complete details for installing fully enclosed retracts on not only an FAI racer, but any model. All details profusely illustrated. Setup requires 180° retract servo. $2.00.

0744/PHONY FOLKERTS—FAI Pylon Racer. This speedster resembles its 1937 prototype from only a great distance, but its looks are more in line with contemporary styles. Plans include four landing gear configurations, including fully enclosed retracts. Foam wing cores and fiberglass fuselage commercially available. $5.50.

0745/TERN—RC Soarer. Twelve-foot wingspan with fiberglass fuselage. Full-span flaperons optimize thermal performance. Coupled ailerons and rudder for tight turning radius. Uses three-function radio, with four servos. Full-size plans (2 sheets) show construction of many useful gadgets. $9.95.

0746/SUNDOWNER (F-4B PHANTOM)—Ducted fan stand-off scale and pattern ship. This practical ducted fan design uses the commercially available J.J. Scozzi "Turb-Ax I" unit. Standard balsa fuse and foam wing construction techniques. Anhedral and polyhedral wing capture the rakish lines of this popular design. Plane is totally capable of contest calibre maneuvers. Hot rear rotor 40 engine. $5.50.

0641/OSKER—RC flying boat. Either built-up or foam 86" span wing. Radio is sealed in unusual waterproof compartment that is integral part of wing/cabin assembly. Fuselage is basic box structure, with no tricky keel construction. 35-45 power. Four-function radio. 60-powered version available—see below. $5.00

0642/OSKER + 10%—Same features as regular Osker, for 60 engines. $5.50

0643/NOVI ARROW—FAI Pattern ship. Designed by John Brink, twice winner of the South African NATS, and noted internats competitor. Large 70" elliptical winged model emphasizes light wing loading for smooth maneuvers. Large plan sheet is highly detailed. For retracts and 60 engine. $6.00

0644/SPINKS AKROMASTER—RC Semi-Scale Sport Trainer. Like a Taurus, this model sports a large wing for slow, stable flight. A square fuselage, and sheeted built-up (or foam) wing make for quick building. Modeled after a sleek looking full-scale aerobatic design, Akromaster is an excellent choice for introductory aerobatics. Four channels; 60-71 engine. $5.00

0645/BIG BOY IV—1973 FAI Power Free Flight World Championship winner. High-thrust model is a highly refined basic design. Autorudder and V.I.T. Renowned a top class, consistent model. 64" span; 595 sq. inches. 15 power. Two plan sheets. $5.00

0541/FAKIR I—Pattern ship. Winner of AAM's Super Design Contest. Plane has received accolades for its clean lines and striking looks. Well-engineered plan set includes hints on construction and installations. 60 engine. Four- to five-function radio. $6.00.

0542/MONSTERS & MONOPLANES—Successors to Bipes 'N Tripes (Plan No. 0342). The monsters are twin engine biplanes. Plan shows German and British monsters and monoplanes—four different planes altogether. 49-powered CL. Free Tenderfoot decals included. Special Tenderfoot price. $1.00.

0543/RUDDER-BUG—RC sport model is a revised version of Walt Good's 1954 Berkeley kit design. High-wing trainer or Sunday flyer. Can be flown with anything from single-channel to full-house radios. 61-in. span. 19-35 engines. $5.75.

0441/FLEXI-FLIER—Scale version of RC rogallo hang glider uses a GI Joe doll a control surface. A highly unusual slope soarer, it can also be used on tow. Uses two standard servos. $1.75

0442/MISSY DARA—QM with high scale fidelity. Integral wing/fuse construction foam cores. Either front or rear motor 15 engine. $3.00

0443/THE FLYING OUTHOUSE—CL semi-scale 049 rendition of EAA project. Not necessarily aerobatic, but an attention-getter that is strictly for fun. Special Tenderfoot Price. $1.00

0444/BOOMERANG—Free flight helicopter has dethermalizer-activated trip switch to give forward flight and autorotation. Simple construction employs cardboard engine shroud and full-balsa fuselage. 049 engine. $4.00

0341/SUNDAY FIGHTERS—Small, responsive biplane is quick to build with Ace foam cores. Two versions shown on plans. Ken Willard design. For 10 engines. $2.50

0342/BIPES 'N TRIPES—Snappy stunting 049-powered biplanes and triplanes can be built in three styles. Ships are quicky-built and are great for WWI Combat. Tenderfoot plan special. $1.00

0343/DAS KRAUT—Crazy, capable stunter incorporates features such as moving rudder, shock LG, tip weight, etc. For 40 engines. Nice WWI styling. $3.50

0344/TOADSTAR—Huge 150-in. span Toad is constructed of foam, ply, Manila folders, anything! Great payload carrier with two 61s. Not full-size plans. $2.50

0345/WEDGY—An 020-powered revision of 40s NATS winner. Bold lines highlight proven performance. $3.00

0241/NEBULA—Dick Sarpolus' unique RC sailplane c built with polyhedral or dihedral and optional flap system. All-balsa fuse, sheeted foam core wings. All-moving tail. Plug-in panels. $5.00.

0242/PAZMANY PL-1—Scale EAA home-built aircraft model by Nick Ziroli. Features include all-moving stab, balsa construction and 45 size engine. Two detailed plan sheets. $6.00

0141/SHRIKE—Fabulous RC Pattern ship designed by pylon champ Bob Violett is very smooth, fast flyer. Design is intended for fiberglass fuse, foam wing, retracts and a hot 60. $4.50.

0142/FAIRY UNLIMITED—Rubber FF design with lightweight construction for good performance. Features many innovations. $3.50

0143/METEOR MK8—CL Scale model uses unique ducted fans (2) and 40 size engines. Text and plans explain fan construction. Large ship has 58-in. wingspan, 66-in. length and weighs 12-13 lb. $6.00.

1231/T-19 TRAINER—CL Tenderfoot design has flat fuselage for easy construction and unique removable wing and tank. 36-in. span, for 19 to 25 size engines. Special price. $1.00.

1232/FAIREY BARRACUDA—Unusual-looking Scale FF project is rubber-powered. Stick and tissue construction. Good flying characteristics. 35-in. span. $2.50.

1131/ELECTRA-FLI—Easy-to-build Sport ship is electric-powered for fun, quiet flying. Ship is designed for use with the Astro-10 motor. $4.00.

1132/FAIREY FIREFLY—Dave Platt's four-view scale drawings of a proposed NATS level Scale project. The drawings do

AAM PLAN SERVICE
733 15th. St. N.W., Washington, D.C. 20005

Gentlemen: Please send the plans listed by First Class Mail at no extra charge. I enclose _____ total for plans listed.

NAME _____

ADDRESS _____

CITY, STATE, ZIP _____

Rates quoted above pertain to the USA, Canada, APO's, and FPO's. For foreign orders please add 25% postage.

PLAN NO.	COST

Why not order our complete plans catalog? only $0.25 ea. _____

TOTAL: _____

not contain construction information, but are well-detailed for scale assistance. $3.00.

1031/WARLORD—This great RC ship was designed to win in FAI competition. With a 61 the Warlord becomes a highly competitive plane. $4.25.

1032/CONSOLIDATED B-24D LIBERATOR—Would you believe a 55" wingspan, four-engined, RC, three-channel B-24D with a flying weight of 36 oz.? It flies great with our 020 PeeWees. Two sheets for $7.00.

1033/FOCKE-WULF TA 152—Hal Cover's design fits right into the Annual Flight Masters Jumbo Rubber Scale Meet. Construction methods make this a strong plane. $2.75.

1034/BOSTA—Try Neal White's unique design of an elliptical combat plane. Not only is it good looking, but it flies great! $2.50.

0931/SPEZIO SPORT TUHOLER—Smooth and responsive CL Scale ship flies like a typical non-flapped stunter. For 35 to 40 engines. Two sheets. $4.50.

0932/PISCES—RC pattern ship by Dave Hale for AMA-FAI patterns. For side-mounted 60 engine and retracts. Ship has 710 sq. in. area and clean lines. $4.25.

0933/SPARROW—Ship used by Air Force in RPV program presented for modelers wishing to take home movies in flight. Uses Ross four or twin 60s or 80s. Two sheets. Fiberglass and foam construction. $7.00.

0934/CURLEW—Sport FF model has unusually graceful lines and performs quite well. Rubber-powered, the ship has a 24-in. span. $2.00.

0831/OLE TIGER—Sleek Quarter Midget racer uses fiberglass arrow shafts as spars for simple wing construction. Built-up fuselage. Complies with all QM racing rules, by Don Panek. $3.75.

0832/INDOOR TANDEM—Meets the new one ounce FAI rules. Unusual design has two wings and no stabilizer. Design lends itself to experimenting. $1.50.

0833/SPECTRA—Semi-scale RC version of an amphibian with engine mounted on a pod in tail. Plane has T-tail stabilizer, wing tip floats, 48-in. span for 23 to 40 engines and four-channel radio. $4.00.

0834/SPITFIRE III—Large UC stunt ship features near-scale appearance for impressive looks. Has removable 58-in. span wing, by Mark Freeman. $4.50.

0731/DELTA DIAMOND—Sport and slope glider has an unusual delta shape. Uses aileron and elevator control. Small, lightweight design by Ed Erfurth. $3.50.

0732/"OSPREY I"—18-in. span FF seaplane uses Brown CO-2 power in a pusher configuration mounted on a pod above the wing. Fun flyer for ROW. $1.25.

0733/SKYPHONIC—An easy to fly, 40-in. span ship designed for two channels and 049 engines. Has trike gear, swept wing, inverted engine. $2.50.

0734/CRITTER—Marblehead Class racing yacht by Victor Migliorina has an all built up construction, 50-in. length, hull is built inverted. Xerox copies of drawings accompanying article available for 50 cents each. List drawing by figure number and order through plans service manager. $3.50.

0631/UPPER CRUST—Very strong 1/2 A FF ship has a pre-stressed wing with full ribs in a geodetic-type construction. Has English-style fin located behind stab on a most triangular cross-section fuse. $2.50.

0632/PRAIRIE DUSTER—Small, lightweight RC pattern ship uses built-up balsa wing with built-in ailerons and a plywood wrapped fuselage. For retracts and 60 engines. $5.50.

0531/FRIEND SHIP I—Streamlined RC Pattern ship for 60s, retracts. Uses foam wing and fairly simple balsa fuse construction. $4.75.

0532/FRANTIQUE I—WWI type plane with open framework fuse, built-up wing. Can be built in three different sizes according to engine—19 to 35. $5.00.

0533/THE RELIANT—Sound Wakefield design creates a consistent flyer. Torque-actuated stabilizer and rudder. $3.75.

have gone to is a slightly larger airplane, with a little more wing area, in order to do square corners without losing power or stalling out. This way, you get more vertical ascent without a particularly overpowered aircraft.

The top European fliers have been flying with variable roll rate for some time. Prettner and Matt both have this on their transmitters. At Gorizia, they were waving that stick around all over the place, with very little change in the aircraft—until they came to the rolling maneuvers. Then they changed over to the high roll rate.

Lowe: I'm using basically the same engine that I used last year; the airplane is the same Phoenix 6. I have hopped-up the engine a bit. All I've done to accommodate the new pattern is to increase the roll rate a bit—that's for two reasons: Number one, the three axial roll maneuvers require no more than five seconds. Secondly, you need a faster roll rate to get through some of the maneuvers, like the Top Hat.

Hill: It would seem that all the planes that were going last year are probably going to be okay for this season. Now the trouble is power-to-weight ratios. Wing loading has generally been at the maximum allowed, by virtue of trying to stuff everything into the plane. This year, several maneuvers require brute horsepower, notably the new Top Hat. If you don't have a super engine, then you'd better have a light airplane. So, you can take your choice—if you want a lighter airplane, then an average engine will do. However, most fliers prefer a fairly heavy airplane, and thus a high horsepower engine.

Bridi: The American models that we use—like the Mach I, Tiger Tail, etc.—are probably going to have to be redesigned a little bit, in order to slow them down, and get less penetration. We have a high wind factor in the United States. We may have to fly one airplane here, and then go to an international competition and fly a different type of plane. I feel that the Kaos is more designed to the European style—with more percentage of the wing, it's a little slower flying airplane than most. I've had to up my speed, power and everything just to stay up with these guys. On the Top Hat, especially, there's more emphasis on power than I would like.

Chidgey: Primarily, it's going to take a little lighter wing loading than we've been flying. Slower airplanes will probably score better than the faster ones. If you can slow them down, you can make smaller maneuvers, and place them in a little closer. That's kind of the way I'm going. I'm not doing anything drastic design-wise, but I'm trying to build a little lighter, and a little slower airplane.

AAM: *Realizing that this interview is occurring in early May, at a time when there has been little competition with the new pattern, do you feel that the new maneuvers are tough to fly, or is it just a matter of unfamiliarity?*

Hill: A month and a half ago, I think all the fliers would have said that the new pattern was tough. I just went to the first contest of the season in Raleigh, North Carolina, and even the D Novice fliers looked good. Frankly, the Figure M, the way it's been clarified, is not really as good a maneuver as the old Figure M. It's too busy, and it doesn't have the go/no-go aspect. I mean, you can't keep from getting some points, no matter which way you do the stall turn. It is the sequential aspect of the new pattern that makes it more difficult.

Lowe: There are some new, different and tough maneuvers. The fact that you've got to do a maneuver on each pass, and that you can't turn around to get your preferred heading makes things difficult. Some guys can't do maneuvers unless they fly them from right to left. Now the flier has to do some maneuvers from left to right, which makes it more demanding. So, I guess if you couple the sequence of things with the tougher maneuvers, it makes it tougher.

They're requiring a constant descent in the rectangular landing pattern. I'm not too crazy about that. A guy is going to have to start the maneuver very high, in order to continually descend, and to be able to see that the plane is continually descending.

The Top Hat is, in my opinion, easier. But, if a guy leaves his roll rate the way he's had it, the maneuver is going to be awfully big.

There's been a lot of yak about squeezing the pattern in tighter. The slow roll isn't going to be from county to county anymore. It has to be about five seconds, and that squeezes it some. One really good maneuver is that Figure M—that ought to be worth a multiplier of 20. That is really demanding, and I'm all for that, as long as there is no luck in it. As long as it's a good challenging maneuver—as far as the airplane's performance and the pilot's ability—then it's the kind of maneuver we need. I have two roll rates on my transmitter—that's another gimmick you are going to have to have.

Kraft: Well, I think that the pattern has some ridiculous maneuvers in it; and everyone I've talked to agrees. For one thing, the full roll in the Top Hat, going up, places a tremendous premium on engine. And, of course, making the event more specialized is less suitable for the broader modeling spectrum. I think that there is too much emphasis on rolling maneuvers in the pattern.

I don't think that the maneuvers are particularly tough, although there's more room for error. Anytime you put those half rolls into the various maneuvers, you put in additional things for the judges to score as mistakes. I don't like the pattern, but I appreciate the concept of greater difficulty.

Martin: I guess that the Figure M would be the most difficult. They have made it easier by allowing the rolls in either direction. If you stall turn the wrong way, you're only downgraded, and not zeroed for the maneuver.

The only benefit of the new pattern is that it puts more demands on the flier to do maneuvers in both directions. A lot of fliers, myself included, have become very one-sided. My plane does rolls very well into the wind; consequently, I have always practiced in

one direction. It's obviously easier to perfect a maneuver in only one direction.

I don't believe that the new sequential flying, even though there's a maneuver on every pass, is good for spectator appeal. A flier who has style and class will always find something appealing to do upwind. A good flier will make his fly-bys look good and entertaining.

Chidgey: The Figure M is tougher. It doesn't give you time to set up and compensate during the maneuver. Everything is bang, bang. You have to have the plane set up very precisely before you start the maneuver, or you'll find yourself in trouble. The Eight Point Rolls are pretty tough right now—all that takes is practice.

The Top Hat is no harder than the old Top Hat. I think that it's easier, because it doesn't call for a hesitation after the roll.

Most people prefer one direction for a certain maneuver. Now, they'll have to learn to do them both ways. I would prefer to see the pilot given a little more options as to when and where he does his maneuvers, how he places them, and what kind of pattern he makes of them.

Bridi: I always enjoy doing specific maneuvers in a certain direction, regardless of wind. It makes a better flier out of me. I think that the new pattern will make the individual a much more proficient flier.

I don't think that the Top Hat should be allowed. It takes a tremendous amount of power and speed. It doesn't seem to go along with the rest of the maneuvers.

As these comments show, the FAI pattern still has a long way to go before receiving total acceptance by the fliers. One wonders if the new pattern will really give the event that long-awaited shot in the arm, which most felt it needed. Will the hot (and expensive) engines thwart newcomers? Will the maneuver schedule prove an equitable solution to the problems of arbitrary or biased judging? Will spectators now see excitement, rather than the previous monotony?

These, and other questions, will be answered this summer. The big get-together of the country's top aerobatic competitors will be at the Lake Charles NATS. What they do there will be a good indication of the style and trends at the Masters Tournament in October. Everyone will be anxiously watching to see how the U.S. comes to terms with the new pattern, and how we put it all together for the 1975 Internats.

*For further information on these changes, refer to the *AMA Rule Book*, pg. 67-71. Also, see Don Lowe's column and the AMA section in the July AAM.

HOW TO FLY A MODEL

(Continued from page 24)

of special modeler treatment. When you call United (this is exclusive to United Airlines), or your travel agent to make your reservations, ask them to refer your reservation to the E$P Desk and tell them "I am traveling with Modeler E$P from LAXRR." Of course, if you are taking your model along, be sure to tell them at this time so space will be reserved for it, and special arrangements may be made for loading.

Now that we have built and labeled our Super Aeronautical Instrument Cases, we can seal the lids on them for now. "Model Aircraft," "Baggage," and "Fragile" should be clearly written on the cases. Since our models look more like freight than baggage, I highly recommend such labeling. Also, when you check in at the airport, be sure to ask for some "Special Handling Tags." The agent will be glad to put them on for you, and they will serve to alert our loading personnel.

In closing, I shall leave you with this final thought: If you don't mind a little special attention from the airport security people and the stewardess, you may carry your flight box as carry-on baggage—provided it is small enough to fit under the seat.

POLING ON ELEC. FLIGHT

(Continued from page 60)

Question: How can I charge my batteries from house current?

Answer: It is not very useful to do this, no charger for radio use is acceptable, and there is no reason to design one, since bench running the motor is [redacted] sure way to ruin it (see the first question). This column writer would point out that it is useful to charge [redacted] pack from [redacted] charger on trickle charge (as is the practice in digital sets) if the cells in the pack are unevenly charged. A trickle charge will allow all the cells to rise to a full charge overnight. Astro packs are already matched, so there is no need for this on Astro equipment.

Question: How can I get longer flights than normal?

Answer: Install a servo operated toggle switch to turn the motor on and off. Flight times can be more than doubled this way.

Question: What breakthrough in batteries has permitted the fifteen minute charge.

Answer: A variable rate charge circuit (patent pending) is used. A large initial current is applied to the nearly discharged battery. The charge drops gradually to a low level when the charge is complete. Even if a fully charged battery were accidentally recharged for fifteen minutes, [redacted] damage would result, provided that the battery had been allowed to cool after the previous charge.

Question: What breakthrough in motors made electric flight possible?

Answer: No magic solution. The ingredients for success were good magnet material and an armature matched to the prop to provide a maximum useful thrust at aircraft flight speed. Static thrust alone is not a measure of the thrust available in flight.

Question: Will the electric motor affect the operation of my RC system?

Answer: Radio operation will not be affected if the motor leads are kept short and routed away from the radio antenna and radio battery leads.

Question: What type of models are suited for electric power?

Answer: Start with a high-wing, Cub-type plane with a flat bottom open frame wing, and roomy fuselage. Two-channel radio [redacted] suitable for the Astro Pup and the Astro 10. Use three-channels for the Astro 25. Keep the plane simple and light, with [redacted] good lifting airfoil 10% to 12% thick. For best results, the plane and radio should weight [redacted] more than the motor and batteries. Recommended weights for the plane plus radio (no motor unit) are 14 oz. for the Pup, 22 oz. for the 10, and 40 oz. for the 25. [redacted] sure to provide cooling air through the batteries and [redacted] exit for motor cooling air.

Bargains: A.H. Louchard gave another source for RS 54 motors. Order part number 2700-2, price $4.50, from True Temper Corp., Cordless Grass Shear Dept., P.O. Box 608, Ashtabula, Ohio 44327. These [redacted] Yuasa batteries and are of good quality. Olson also sells [redacted] 12-volt charger for $1.19, part BA-188N. Electronic Distributors, Inc., 4900 N. Elston Ave., Chicago, Ill. 60630, sells GE/GC-1 "AA" Permacells for $2.59 a pair, and a 0 to 10 ampere meter, part F362, for $1.79. Minimum order is $3.00. Till next time, Good Flying!

Astro Pup: I just received [redacted] production model of the Astro Pup, an 049 electric unit manufactured by Astro Flight, Inc., 13377 Beach Ave., Venice, California. It turns a 6 [redacted] prop at 15,000 rpm and gives flight times of five to eight minutes. It has flown the Ranger 42, Jr. Falcon, Whizard, and Jr. Skylark. The Skylark is four-channel, and does loops, rolls and inverted flight. Charging is simple, use six feet of No. 20 appliance cord and charge from a twelve-volt car or cycle battery for fifteen minutes or less. Astro Flight also makes a neat rapid charger for the Pup, featuring [redacted] ammeter to monitor charge current after fifteen minutes or less as selected by the operator. The charger comes with either alligator clips or [redacted] plug for the cigarette lighter in [redacted] car—specify which you want: The Pup [redacted] $34.95; the charger is $24.95. I plan to fly a Ranger 42 with the Pup (two channel), and Roland Boucher has been pylon racing with it! The unit has [redacted] solid margin of performance over the RS 54, which is the same size.

OLSON ON MULTIWINGS

(Continued from page 62)

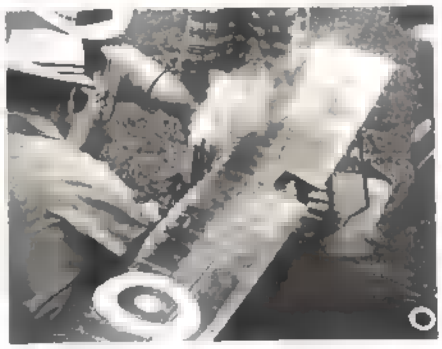
match and, in all probability, surpass any thing that's around today in the way of begin[redacted] aircraft. In fact, I'll guarantee that we'll have one available within the next 12 months —even if I have to come up with it myself.

There are those among us who would have us believe that, if it's not a Formula I or FAI job, a scale ship with retracts, flaps and built-in biffy, or a 120 mph carp-shaped pattern design, it's simply not cool, man. It's not "in" and therefore must be "out"—and kept out. These good people are uptight. If we bipe fliers can't convince them to hang loose and enjoy life, they're going to dry up, lose interest and blow away.

The nostalgia of the biplane, the flying characteristics of the breed, can put new fun in your RC life. Whether you are a jaded competition flier or one of the majority (a sport flier), try [redacted] bipe. There's a whole new world waiting for you, just around the corner.

Achtung! For Those of You Who Are Currently Bipe People: Jerry Nelson wants you! I

Nothing stokes one [redacted] than scale smoke from the stacks. Dick Curzon's B2E adds [redacted] new dimension to exhaust systems (I'll bet they are actually poorly disguised tuned pipes).



want you! The NSPA wants you! What's the NSPA? The National Sport Pattern Association, born in Toledo on February 23, 1974, is a group instigated by Jerry, and dedicated to helping establish a place in the RC competition scene for the biplane. If you're interested in seeing the formation of some type of national bipe program within the framework of the AMA, this is your time to move. Contact Jerry Nelson at once at 23 Marie Dr., Downers Grove, Ill. 60515. Include your check in the amount of $5.00 to cover a year's dues and communication expense. You will receive monthly newsletters, have an opportunity to and dis-cuss the various directions national bipe program might go; most importantly, you'll have opportunity to get involved. If you don't happen to be an organizer type person (a lot of us aren't), I'd still like very much to hear what is on your mind from time to time. Drop me a line care of AAM.

There several schools of thought regarding the exact course we should take with a national bipe program. The Omaha concept (which was the basis of last year's National Multiwing Championships, and which, with a few modifications, will form the ground rules for this year's Championships) is rather low-keyed, free-and-easy concept. It incorporates loose, free-style type pattern event, pylon racing (with the same ships), and sport scale. Jerry Nelson's proposed rules are aimed at a more demanding exacting—perhaps a more professional—type of approach, directed at pattern events only. Art Schroeder, of MAN, has expressed his views in his column more than one occasion. I'm sure that there others who have given the mattern a fair amount of thought. Somewhere between the extremes lies the right road. It's worth finding! Once we buy a program, there is turning back!

Multiwings are on the Move: Al Novotnic advises that the RC Club of Connecticut seriously considering adding bipe pattern class to their regular August meet. . .Walt Schoonard putting something together down sunny Florida. . .Bruce Lund is making every effort to arrange some type of Bipe Fly-in conjunction with the NATS.

Well, folks, keep those cards and letters coming. Potega and God willing, we'll see you next month.

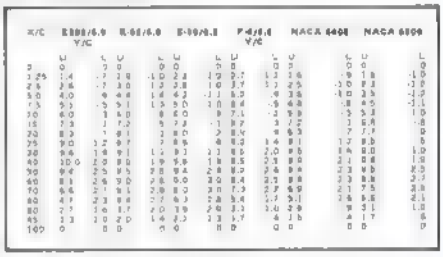
LISTER ON AIRFOILS

(Continued from page 62)

leading edge may be in order for these three.

The NACA 6508 may be somewhere between the extremes of these groupings, i.e., it has a thin nose and mid-chord max camber point. In terms of geometrical features, rather than performance, the most probable route to a successful new experience may lie first with the E-385/Mod 6.0, 8.0 and the NACA 6408. I'd rank them about equal. Next comes the NACA 6508. Third comes the E-58/Mod 6.0, 8.0 and the E-59/Mod 6.0, 8.0. Fourth comes the F-4/Mod 6.0, 8.0. Remember that they were ranked terms of how they looked, not necessarily how they'd behave. The first group has reasonably sharp noses and camber that max out in the first half of the chord length. The second case has its max camber right at the mid-chord but still has the sharp nose. The third group has blunter noses and the camber is beginning to move aft. The fourth candidate has a very blunt nose with forward camber.

Just to give you a little more conviction that these sections may good candidates for soaring, let's take quick look at how successfully two of the sections from the July and August L/D columns turned out. In these issues, two of the sections that were offered up as being new and different, and were derived the same way as the new sections above, the F-4/Mod 4.0, 10.0 and the E-387/Mod 4.0, 10.0. The F-4 Mod was built into six-ft. span slope soarer that worked out pretty well—The Streaker. The E-387 Mod was built into small 38-inch span 020-powered fun flyer replica of a new old timer—The Golden Oldie. Both climb and glide of this ship were terrific. It DT'd into a lake, but came out unscathed just as it was beginning to play submarine. It dried out and flew the next day like the little champ it is. At any rate, the point is that these new sections coming out in this column aren't risky. They work. For those interested in using the new 6% cambered, 8% thick sections, Table 2 below for coordinates:



X/C	E387/6.0 Y/C		E-58/6.0		E-59/6.0		F4/6.0 Y/C		NACA 6408		NACA 6508	
	U	L	U	L	U	L	U	L	U	L	U	L
0	0	0	0	0	0	0	0	0	0	0	0	0
.5	1.4	-.7	2.0	-1.0	2.4	-1.9	2.7	-1.2	2.6	-.9	1.8	-1.0
1.25	2.6	-1.1	3.0	-1.3	3.8	-1.0	3.7	-1.1	3.5	-1.0	2.5	-1.3
2.5	4.0	-1.4	4.8	-1.4	4.2	-1.1	5.3	-.9	3.8	-1.0	3.5	-1.2
5.0	6.0	-1.5	5.1	-1.5	5.0	-1.0	7.1	-.3	5.4	-.8	4.8	-1.1
7.5	7.3	-1.5	6.0	-1.5	6.0	-.9	7.1	-.3	5.8	-.5	5.5	-1.0
10	8.3	-1.5	6.8	-1.5	6.8	-.8	7.1	-.3	5.9	-.3	5.8	-.8
15	9.3	-1.3	7.8	-1.3	7.8	-.7	6.9	.1	5.8	.1	5.8	-.6
20	9.8	-1.1	8.1	-1.0	8.0	-.6	6.7	.3	5.5	.3	5.7	-.5
25	9.9	-.9	8.2	-.7	7.9	-.5	6.5	.5	5.3	.5	5.5	-.4
30	9.8	-.7	8.1	-.5	7.8	-.4	6.3	.6	5.1	.6	5.3	-.3
40	9.4	-.3	7.8	-.2	7.4	-.2	5.9	.8	4.8	.8	4.9	-.2
50	8.7	.1	7.3	.1	6.9	.1	5.4	.9	4.4	.9	4.5	-.1
60	7.8	.4	6.6	.4	6.2	.3	4.8	.9	3.9	.9	4.0	.1
70	6.7	.6	5.7	.6	5.3	.5	4.1	.8	3.3	.8	3.4	.3
80	5.3	.7	4.6	.7	4.3	.6	3.3	.7	2.6	.7	2.7	.5
90	3.3	.8	3.0	.8	2.8	.7	2.3	.6	1.7	.6	1.7	.7
100	0	0	0	0	0	0	0	0	0	0	0	0

McCULLOUGH ON RC

(Continued from page 64)

If we wish to use scale size prop on our model, the required rpm to produce the required power can calculated by

$$(6)\quad P \simeq \frac{(RPM)^3}{(5)^5}$$

Substituting in (5) and (6) obtain

$$(7)\quad RPM \simeq \frac{1}{5^{1/2}}$$

This means that our scale model prop must turn faster than the big one, and, in fact, in a 3" = 1' model, the scale model prop would turn twice as fast.

"Another way of thinking about this to consider that the model prop is turning at scale speed and that scale time is compressed to 1/2 real time.

$$(8)\quad t \simeq \sqrt{5}$$

This may seem weird, but is exactly what has happened. The time required for our scale model to take off from standing start, to perform standard rate turn, do loop or a roll, and to stop after touchdown are all compressed by this same factor.

"Let the unbeliever be condemned to verify these assertions with his own computations. We will, however, illustrate the takeoff calculation for our friends. Since the thrust to

weight ratio is unchanged, the takeoff acceleration will be unchanged; and since the takeoff velocity is proportional to the square root of the scale factor (3), time to takeoff from a standing start is given by

(9) $t_a \propto \sqrt{S}$

"This is the same as the time compression formula equation (8).

"The runway length—L— required to take off is given by

(10) $L = 1a \quad L = 1/2\ at^2$; or $L \propto$

That is the *runway length required by our model to takeoff in scale!!* Similar calculations show that our model will perform scale loops, spins, turns, etc., and with scale power, will have the same ratio of climb speed, cruise speed, and top speed, to stall speed as the big one. Its climb angle will be the same, and it will traverse its own length in scale time under all dynamic conditions.

"In actual practice, we will probably not have a scale motor, and our normal glow plug motor will not be able to turn the scale prop at scale rpm. Usually a smaller prop turning much faster is used, in order to allow the glow motor to develop reasonable power. Because of the resulting propeller mismatch, and because of the somewhat higher drag due to Reynold's number effects, a motor of about twice the indicated shaft power should be chosen. (Electrics which turn larger props more slowly may be useful here.)

"In summary, I propose a uniform and consistent set of scaling rules for *weight, power, thrust* and *time* which will allow modelers to design and construct truly *scale flying* as well as scale looking models. An illustrative table of the Fournier RF-4 as a scale subject is shown below."

FOURNIER RF-4

Span—37 feet, Weight—660 lb., Power—40 HP at 4500 RPM

Scale	Wingspan	Weight	HP	RPM	W/A	W/HP
1" = 1'	37"	660 lb.	40	4,500	7.1 lb./ft.^{2}	21.5 lb./hp
3/4" = 1"	9.25"	13.6 lb.	.315	9,000	1.77 lb./ft.^{2}	43 lb./hp
1/2" = 1"	6.16"	3.07 lb.	.075	11,000	1.18 lb./ft.^{2}	53 lb./hp
1.5/4" = 1"	4.62"	1.66 lb.	.0275	12,700	.69 lb./ft.^{2}	61 lb./hp

Boucher's electric RF-4 is 2" = 1' scale, weights 3.5 lb. and uses an Astro 10 motor of .1 hp. After reading the above remarks, Wischer commented:

"Bob Boucher may be right about the use of thrust in place of horsepower, but common modelers have no way of determining thrust, either of the prototype or the model. What we really need is a rule of thumb using information at hand, and horsepower serves this purpose. We know also that true scale flight is an impossibility as our models fly much too fast, and we are merely attempting

Bob Boucher's 2"-1' scale electric-powered RF-4. It was one of the most interesting new sights at the '73 Oshkosh NATS.

to simulate scale flight. There isn't much we can do about changing the density of air. I don't agree that an engine of about twice the indicated shaft horsepower should be chosen, as he says. If I hold my heavy pattern plan with its nose straight up with the throttle wide open, I observe thrust about equal to weight. Prototype planes will not come close to this power to weight ratio. It is only the really heavy scale job that appear to be sluggish in the air."

Sean McCorrison wrote in and asked how to find out the horsepower produced by various sizes of engines, so as to better apply Wischer's formula to his scale models. The best unbiased sources of power figures for motors are the test reports published in the model aviation magazines such as those by Don Jehlik in **AAM** and Peter Chinn in M.A.N. and English magaiznes. Wischer has collected a list of such data for no less than 80 engines and finds it a valuable tool in using his scaling formula. However, Sean may have us all stumped on the question of the horsepower of a Brown CO_2.

The Best In Scale: That's the title Bob Holman puts on his plan catalog and it fits, for he has perhaps the widest assortment of scale plans and kits available anywhere. Dozens of rare airplanes, as well as familiar names, are included. One particularly valuable reference source for scale scratch builders is the Aeromodeller Magazine three-view plan packs. These are reprints of the many features that have appeared over the years with that special English scale touch. In addition to the article and photos—often including good cockpit shots—which accompany the three-view drawing, is a blue-line print that is double the size of the magazine plane. This makes it easy to scale up to RC size. Getting these from Bob will save the delay of sending overseas. His complete listing costs $1.00 from Box 741, San Bernardino, Calif. 92402.

McFARLAND ON RC

(Continued from page 65)

scheduled for Saturday, July 20th at Tara Stadium, Jonesboro, Georgia. Tom Dixon is CD. Look at the variety offered: Expert, Advanced, Novice, and an interesting profile event. Bonus points to be given as follows in profile: 10 points for side-mounted engine, 30 points for *not* having flaps, 40 points for a bipe. (Wonder what I will get for my tripe?)

Action South of the Border: I am volunteering to lead an expedition of stunt fliers to Mexico City to take part in their international competition. This competition takes place November 15th through 20th, and is sponsored by the Mexican Association of Aeromodeling. CL Aerobatics is among the CL, FF, and RC events that will take place. Reservations must be in early to assure rooms and entry. Write the Mexican Association of Aeromodelling, Apartado Postal No. 2, Navcalpan de Juarez, Edo de Mexico for further information.

Maneuver of the Month: From the *AMA Rule Book*:

13.4. CONSECUTIVE INSIDE LOOPS (three Req'd). Correct loops are judged when the model starts from normal level flight and makes a series of three smooth, round loops, all done in the same place with the bottoms

of the loops being at normal level flight altitude and the tops of the loops with the line(s) at 45° elevation. The model then continues for another half loop, recovering inverted and descending to normal flight level, before being judged for Inverted Flight.

Maximum 40 points. Minimum 10 points.

Errors: Loops are rough and irregular (i.e., egg-shaped, hexagonal, etc.). Bottoms of loops are not at 4-6 foot height. Tops of loops vary more than 2 feet, plus or minus, of the 45° elevation point. Second and third loops vary more than 2 feet from the path of the first loop.

Most find this an easy maneuver, but few [illegible] able to achieve perfection. This can be accounted for by the many ways that small errors can sneak in. Concentration is required [illegible] achieve proper shape for the first loop, but then comes the real challange: placing the second and third loops of equal perfection exactly over the track of the first one. If the wind is below eight mph, downwind will prove to be the best place to place the loops.

However, as the wind velocity increases, you will need to shift the loops into the wind in order to cut down on the "whipping" or tightening up as [illegible] result of the wind. You will have to vary this to match your plane and the wind as much as one-fourth of a lap, in some cases. Again, we are running into variables which prevent a clear-cut, always-true statement—as many would prefer.

I once had a stunter of reasonable capability that would go slack on the lines during the inside (and outside) loops if the wind exceeded five mph. The reason: The large rud[illegible] caused the center of lateral pressure to be far behind the CG; thus, the wind pushed the aft section of the plane to the outside of the circle, causing the nose to pitch in to the center. Opinions will vary somewhat as to stance and body motions, but basically try a slight "spread eagle" with fully extended arm, so that the plane can be lead through the maneuver with arm action, not wrist. Keep the feet in a fixed position from entry to exit.

For the beginner who has not done loops before, first learn to do wing overs until relaxed, now do [illegible] wing over without turning your body with the plane and (behold!) you have done a loop, high but safe. Then work on perfecting the maneuver. In order to do a good job of presenting the Maneuver of the Month, input from fliers of all degrees of proficiency [illegible] needed. Lets here those trials and tribulations along with triumphs, so we can all learn and not get a one-sided presentation. For those who cannot wait, I suggest purchasing *How to Fly U-Control* by Dick Mathis. Cost is $1.00.

Rusty Landing Gear: Mike Ditrick of Erie, Pa., came up with [illegible] simple solution to prevent exposed metal parts from rusting: "Just use ordinary gun blue according to instructions. I [Mike] used Birchwood Casey Perma Blue, the liquid type, and prescribed cleaner. Paint [illegible] chips off with age, not from rust."

Sounds like I should have used this on [illegible] of my 1960 Sharks. These can be cleaned up but, Mike, what is your solution for a rusty pilot?

MARONEY ON RC

(Continued from page 72)

The New Nebula Mark II: Arni Pedersen and Dick Sarpolus [illegible] first-place winners in glider design at the '74 WRAMS with their

Nebula Mark II. The Mark II increased the span 16" over the Nebula Mark I, published in the February '74 issue of the **AAM**. Another difference in the Mark II is that it has a built-up wing, thus lending itself to a production kit which is expected to be released later this year.

National Soaring Society: A long time in coming and something we all knew we needed and wanted, a national organization to better serve the interests and needs of our fraternity, is nearing reality. The National Soaring Society (NSS) is the proposed name that has been submitted by the East Coast Soaring Society (ECSS) Board of Directors to its membership for ratification. Since its restructuring in 1969 from a four-club council to a membership organization, its roster has grown to 912 and is climbing steadily.

The ECSS now has less than 50 percent of its members on the East Coast. This reorganization is the result of a questionnaire completed by the membership, which indicated their desire for reorganization. At the 1973 Annual ECSS Board of Director's meeting, this survey convinced the Board to appoint a five-man proposal of new/revised constitution and by-law amendments and changes slanted toward a national organization. Following this initial effort, all the members of the Board reviewed, changed and unanimously approved the proposal for submission to membership vote.

Simultaneous with the name change, the Board of Directors will be increased in number from nine to 15. This increase will provide the additional Regional Vice-Presidents to represent other AMA Districts ■ required. The proposal also recommends a dues increase effective in 1975. This is necessary in order to provide the additional funding required by the organization's journal, *Sailplane* in order to continue monthly publication. This increase will off-set the inflationary increases in publication, labor, material and postage costs.

These amendments, when ratified, will make official what we all wanted and hoped for: The ECSS will become a national organization, thus giving the United States R/C Soaring a unified front, signifying strength, and therefore commanding and receiving recognition by all as the official and effective voice of aeromodeling. From my vantage point, ■ past President and now Editor for *Sailplane*, I believe that by the time you read this article, the ECSS will be nothing other than a pleasant memory of many early hardships and struggles encountered to establish a strong organization. Most of all, I think, is the satisfaction that we were able to provide a firm foundation upon which the NSS could begin, I hope, its lifelong existence. Should any readers, who are not a part of ECSS, have an interest in becoming part of this soaring fraternity drop a postcard to the ECSS Secretary, Clive Sadler, 46 Oakcrest Drive, Dover, Del. 19901, for a membership application.

Soaring Internats: Since the overseas charter flight for the 74 AEROLYMPICS had to be cancelled because of insufficient reservations by deadline dates, the anticipated turnout of 60 to 70 soaring contestants will probably be cut back to approximately 35 contestants. In the meantime, plans are being finalized for the United States first International Soaring Meet.

The Soaring Internats is one of many special events to be conducted in conjunction with the World Champion meet July 1-7 at Lakehurst, N.J., Naval Air Station. The head CD of the 74 AEROLYMPICS will be Tom Rankin. Tom will be assisted by event directors who will CD each of the various other events. The Soaring Internats will ■ handled by the East Coast Soaring Society under the leadership of the ECSS President, George Durney. The U.S. Team will be headed by Team Manager, Don Clark.

The official competition commences on Friday, July 5, and will continue through Sunday, July 7. The events will be conducted daily from noon to 5:00 p.m. Since this is an International Meet, the current FAI Soaring Rules will be in effect. The Series A portion for Thermal Gliders, which includes Task A—Duration, Task B—Speed, and Task C—Distance will ■ used. Each round includes ■ separate flight in each of the three tasks. Currently, three rounds are planned. Competitors will also have the opportunity to choose either a motorglider or non-motorglider for competition.

FAI RC Soaring Ruling: For Thermal Soaring Tasks B and C (distance and speed), the committee for International Aero Modeling (CIAM) officers at the April 4 meeting in Paris, France, agreed that the model must be in gliding flight when it enters the course. The previous ruling did not prohibit the use of RC Motorgliders to fly the course under power.

FAI Rules Proposals: Soaring pilots, the time is now (and until August 31) to send proposals which you feel will improve the FAI modeling competition or records rules to AMA HQ. All suggested revisions will be reviewed by AMA's FAI Activities Committee, plus any others that may be designated by the President. The rules deemed appropriate will then be forwarded to FAI for placement on the agenda of the CIAM Plenary Meeting which will be conducted December 5 and 6 in Paris, France, this year. Any AMA member may submit a proposal to AMA HQ. Your proposal should state the existing exact wording, proposed change (exact wording), and a brief but complete statement of why the change is needed.

WHAT'S THE NEWEST SPORT?
SEE PAGE 11 FOR THE ANSWER

MEUSER ON FF

(Continued from page 73)

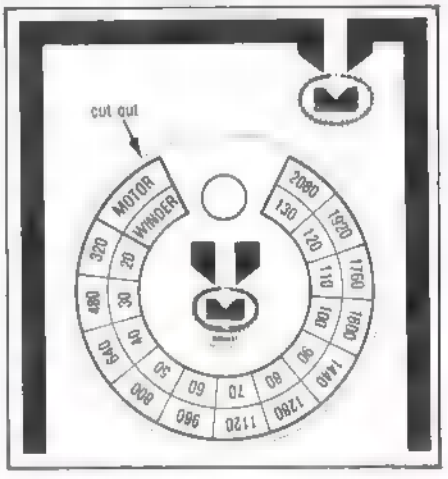
record in Class A, Class B, and FAI Power.

The two Midi-Pearl kits are identical except for the wood, i.e., heavier wood is supplied with the FAI kit.

Meuser says that with a powerful Class B engine turning an 8" prop at 20,000 rpm, no wing warp, downthrust, or sidethrust are required. But, don't try to fly the same ship with a hot Rossi 15 turning 24,000 or more. With a Rossi, some wash-in of the right wing panel (the trailing edge on the inside during the right-turning climb) is required. To make the wing warp effective, some downthrust, and possibly some sidethrust, is required. The thrustline angles shown on the Meuser plans are substantially correct, within normal adjustment tolerances.

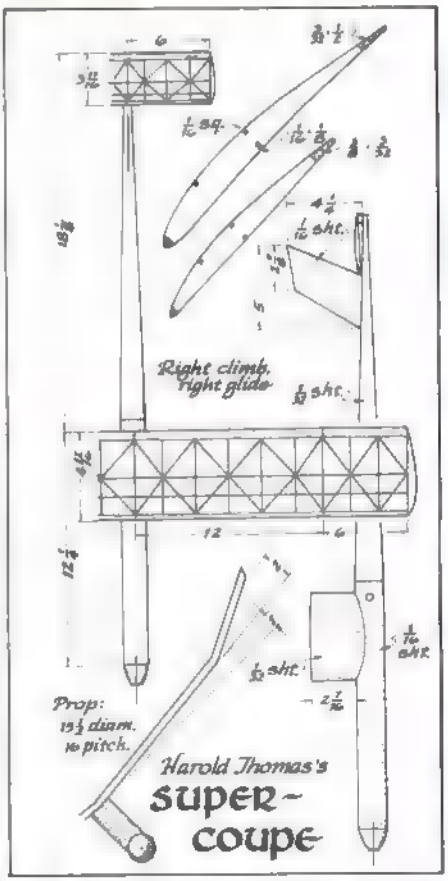
The Midi is available from M&P Enterprises, 1222 Briarcove Dr., Richardson, Tex. 75080, for $12.98 plus 10% for postage. FAI or A-B should be specified when ordering, so that you get the correct grade of wood.

Rubber Motor Winder Conversion Chart: Courtesy of Jim Newman at Midwest Products is this handy conversion chart for your favorite rubber winder (Guess what company makes a really nice one?). This chart works only for a 16:1 ratio cranker. If used on a Marlow mechanism, relocate the 320 designation below the 20 mark. A little contact cement, and this chart, and all the guess work of motor winding is eliminated.



Super Coupe: Winning any event at the annual U.S. Free Flight Championships, largest FF affair west of the NATS, takes some doing. Harold Thomas managed to win the Coupe d'Hiver event there two years in a row using the Super Coupe, his first Coupe model. The model is disgustingly simple in its design and construction: Square tips, rolled tube fuselage, solid rubber, Union-Jack-type geodetic construction in both wing and stabilizer frees the flier from much concern about unnoticed warps ruining a flight. If you haven't tried a rolled tube, do so. Simply soak ■ piece of 1/16 x 3" balsa in water, wrap it over ■ piece of one-inch OD tubing, wrap it with gauze, and let it dry, or cook it if you wish to speed up the drying. Some modelers prefer to coat the inside with glue or tissue before rolling the tube.

Harold Thomas' Super Coupe is easily built, and features warp-free geodetic construction.



Short Flight Testing: The sketches show two systems for dethermalizing a power model ■ few seconds after the engine quits. That saves a lot of time while the model's power pattern is being adjusted. Both methods employ ■ additional wire arm, similar to that on ■ DT timer, and ■ auxiliary face plate to hold it. The auxiliary plate may be aluminum, formed to provide ■ pivot for the wire (similar to the construction of the Tatone face plate), or it could be brass, with a piece of brass tubing soldered to it to serve as the pivot. Both sys-

(Continued on page 106)

MODEL AVIATION
Official Magazine
Editor: Carl Wheeley

AMA NEWS

ACADEMY OF MODEL AERONAUTICS
806 Fifteenth Street, N.W.
Washington, D.C. 20005

World's Largest Sport Aviation Organization

1973 AMA Financial Report

AMA did exceedingly well in 1973, ending the year with a $75,513 surplus. This was better than predicted by the budget approved in early 1973, mainly because we did not spend a lot of money we had planned to.

For example the Executive Council approved a basic budget that showed a $100,500 surplus, then added a supplementary budget that would have used $82,700, leaving a net surplus of $17,800. But we didn't spend about half of the supplementary budget so the actual surplus came out higher than originally expected.

We didn't spend the amount allocated for an assistant to the executive director because the right man ■ hard to find at the price authorized (probably impossible). We also didn't spend money which had been allocated for legal aid concerning the FAA—the situation calmed down that had earlier looked grim and has been quiet ever since. We also didn't need all of the money that had been put in reserve to support the Nats ■ Oshkosh. Although the Nats lost money, it didn't lose as much as we thought it might.

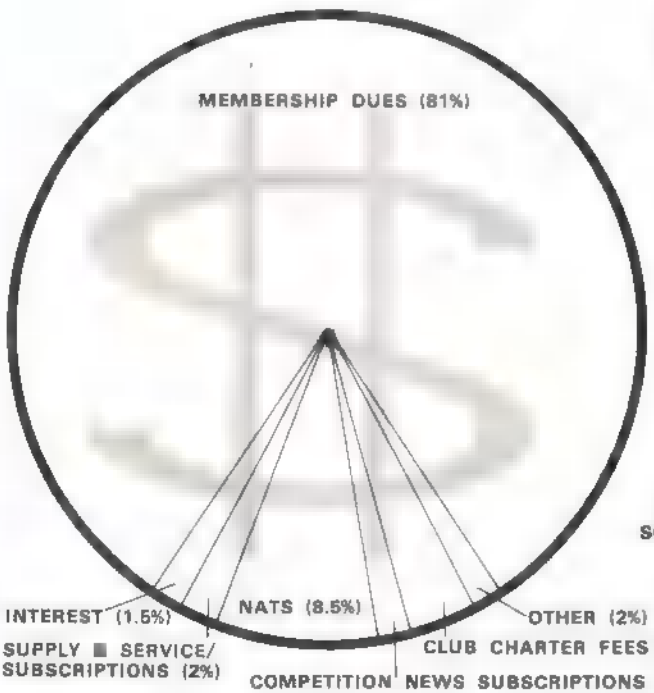
With the surplus we show for the end of '73, a natural question is whether we needed the dues increase which was put into effect the same year. A comparison of '72 vs. '73 expenses eliminates any doubt: our '73 expenses were $184,000 more than for '72—$656,000 vs. $472,000. It's true that we could have gotten by with a smaller increase, but the increase was intended to last for several years at least, anticipating that expenses would continue to climb each year. In the meantime, the dues increase prevented a deficit situation for 1973.

For 1974, a 20% increase in expenses has been budgeted in almost all departments. This is a big percentage allowance yet apparently not excessive according to the current trend and rate of inflation. With that allowance the 1974 budget shown provides for a surplus of about $25,000, but

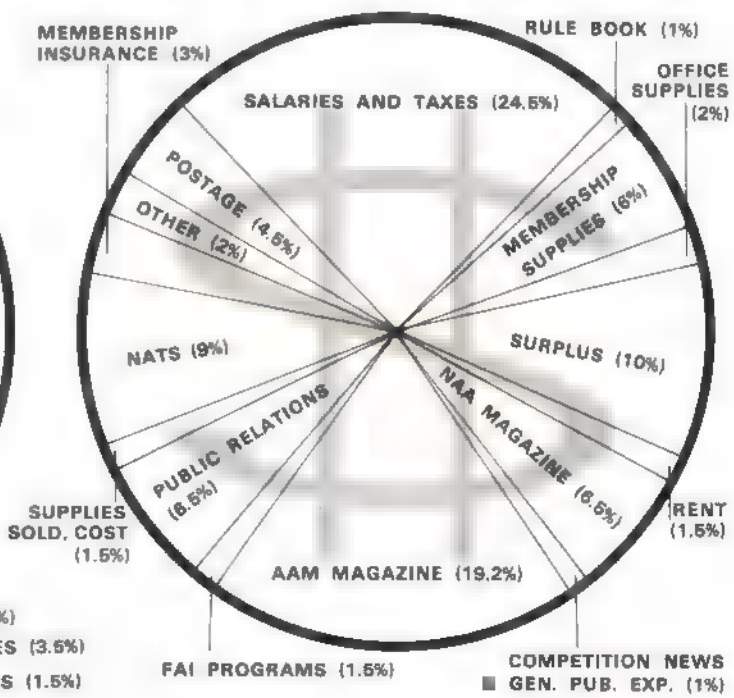
(continued on page AMA 6)

THE 1973 AMA DOLLAR

CAME FROM



WAS USED FOR



AMA FINANCIAL STATEMENT — YEAR ENDING DECEMBER 31, 1973

Balance Sheet

Assets

Current Assets:	
Cash/Checking Accounts	$ 77,158.56
Petty Cash	100.00
Cash/Savings Accounts	387,072.96
Accounts Receivable (owed us):	
Misc. Accounts Receivable	1,941.11
Advances/Employees	116.75
Nats Trophy Sponsorship	1,730.00
Nat'l. Assn. of Rocketry	1,218.77
Deferred Expense (paid in advance):	
Prepaid Insurance	621.48
AAM Magazine	23,632.01
Supplies Inventory	3,481.76
RC/WC Charter Deposits	5,119.80
NAA Magazine Postage Deposit	12,735.00
Less 25% to Expense	(3,184.00)
1974 Membership Expenses	21,984.94
1974 Supplies	2,060.00
Fixed Assets:	
Furniture & Equipment	43,051.04
Less: Depreciation Reserve	(18,358.89)
Total Assets	$560,481.29

Liabilities & Net Worth

Current Liabilities (we owe):	
Accounts Payable	$ 9,244.00
Accrued Taxes	166.37
Employees' Escrow	2,286.76
Deferred Income (service due):	
Membership Dues/1974	387,071.25
Other	18,839.75
FAI Team Funds (in trust for team travel within U.S.):	
Free Flight	11,081.11
Radio Control	2,431.73
Indoor	2,065.10
Control Line	2,658.54
Scale, General	1,470.44
Other Funds (held in trust):	
Scholarship Fund	7,737.30
Howard McEntee Fund	1,047.00
Net Worth:	
Balance, 1/1/73, Adjusted	42,725.46
Income for year 1973	75,513.18
Scholarship Fund Allocation	(3,856.70)
Total Liabilities/Net Worth	$560,481.29

Expense Statement

Operating Expenses—by Department

Membership	$181,296.27
Publications	233,530.12
Supply & Service	14,667.13
FAI Programs	30,605.19
Contest Administration	20,585.00
Officer Services	5,786.15
General Administration	72,379.99
National Contest	97,995.61
Total—All Departments	$656,845.46

Operating Expenses—Detail

Salaries and Taxes	179,460.24
Rent	9,362.86
Telephone/Telegraph	5,231.42
Postage, General	31,569.86
Office Supplies	15,024.33
Public Relations, General	14,253.07
Travel/Trade Shows	3,445.32
Meetings	3,042.35
Film Project	20,000.00
Film Library	2,120.07
Air Show Team	2,874.44
Insurance, General	3,265.92
Depreciation	5,014.67
Legal & Audit	2,576.90
Membership Supplies	44,832.08
Rule Book	7,076.57
Insurance, Membership	24,804.00
Supplies Sold, Cost	10,551.13
AAM Magazine, Purchase	124,466.21
Postage	16,969.16
Comp. News & General Pub. Exp.	7,398.35
NAA Magazine	47,655.40
FAI: Team Expenses	4,165.09
Records (NAA Fees)	50.00
Franchise Fee	3,856.70
Miscellaneous	1,815.46
Nats: Hobby Shop	6,652.28
Trophies	5,389.20
Officials' Fees	3,751.00
Officials' Expenses	7,383.03
Airfield Rental	15,000.00
Housing	5,100.00
Equipment, Car Rental	6,790.49
Service Contracts	3,019.15
Charter Flight	3,056.16
Miscellaneous	9,603.55
Uncollectible Accounts	219.00
Total Operating Expenses	$656,845.46

Income Statement

Operating Income—by Department

Membership	$214,838.23
Publications	260,351.00
Supply & Service	15,229.99
FAI Programs	31,662.50
Contest Administration	33,525.25
Officer Services	11,893.00
General Administration	89,187.00
National Contest	61,606.42
Total All Departments	$718,293.39

Operating Income—Detail

Membership Dues	$594,647.37
Sanctions (AMA, FAI meets)	3,793.25
Sanctions (FAI Records)	247.00
FAI Stamp Sales	1,683.50
NAR Insurance	1,579.09
Supply & Serv./Subscriptions	15,229.99
Mailing Services & Serv. Chgs.	1,445.85
Club Charter Fees	25,230.92
Non-Charter Meet Fees	1,240.00
Competition News Subscriptions	11,590.00
Nats: Sponsorships	17,280.00
Hobby Shop	9,565.89
Entry Fees	18,642.00
Concession, Camping Fees	7,406.49
Other	8,712.04
Total Operating Income	$718,293.39
Less Operating Expense	656,845.46
Operating Gain	**61,447.93**

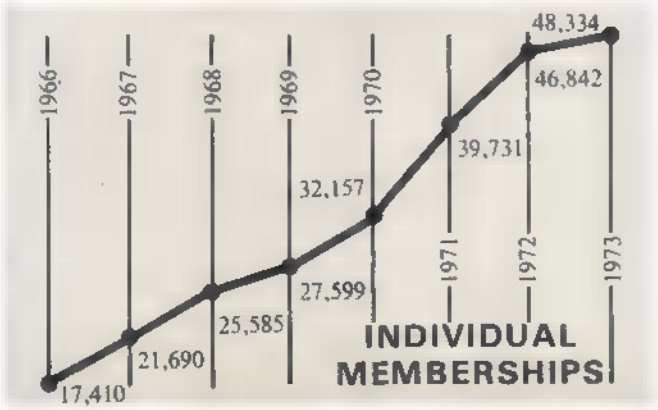
Other Income

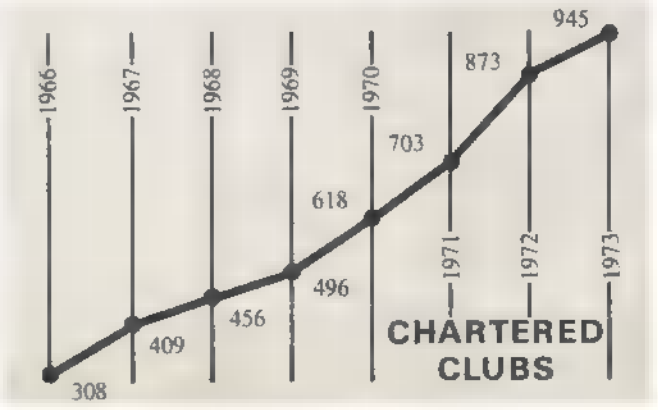
Life Member Contributions	2,185.00
Booster Fund Contributions	246.06
Interest, Savings Accounts	11,634.19
Net Gain—1973	**$ 75,513.18**

Respectfully Submitted,

John Worth

John Worth
Executive Director





Justa Buncha Thoughts and Hints

PRESIDENT'S MEMO

Weird Weather. Did the wind blow at your house? It has blown with extreme vigor over most of the United States this winter and spring. And when it didn't blow it usually dumped five inches of rain or three feet of snow on us in Dallas—the greatest extremes in weather that anyone can remember. The coldest, the hottest, the dryest, the most snow, the most tornadoes, but above all the one that affected our miniature aeronautics hobby the most was the wind. Each one of us is sure that he personally has the lousiest weather. Funny, but when we tell the other fellow about it, we notice he isn't listening because **he** is thinking how much worse **his** weather was than yours.

But wind never seems to dampen the modeler's enthusiasm. From all we hear there is more interest than ever before. Flying went on in spite of the wind. Those who flew probably found that they learned much faster, because the wind increased their problems. It probably also taught them a lot about repairing model airplanes. And, of course, when the weather is impossible, the word is **build tomorrow's airplanes!**

This year, here in Texas, we have had the highest and most constant-blowing winds in history. Just to stay active we even flew kites that were really sewer lids welded on the end of a long chain. For a wind sock we'd sink a six by six post in the ground and fasten a stout chain to its top. Wind speed is judged by the angle of the chain. We usually keep on flying if the chain is standing straight out, but if the links start to snap off, we chicken out and go home!

Electric Planes. As model airplane flying becomes constantly more popular, suitable places in which to fly are more scarce. Noise is usually the villain. I believe that a fascinating solution to this is just around the corner in the form of electric airplanes. The only sound is an innocent whirr from the propeller. No one will holler at you for annoying them unless you do it in some other manner! Enough research has been done on electric planes to prove they are feasible and fun. You will find them advertised in all of your hobby publications. Try 'em! You'll like 'em!

Simplification. We need but look at our national government to see a prime example of constantly increasing complication. Nothing is ever simplified. Observing this example of confusion, we must make sure that in its enthusiastic growth AMA doesn't get caught up in this same whirlwind. The number of official and provisional events we fly already is staggering (and many have substantial duplication). It already nearly takes a lawyer to interpret our AMA rule book. Let's be careful lest we let complication and sophistication kill our fun.

New Groups Forming. With the tremendous popular growth of AMA in the past few years, it has been hard to keep up with the organizational needs. The leaders of AMA frequently have suggested that special interest groups be formed within the AMA structure to help develop and direct the separate special interests. Some special interest groups have been operating very successfully under the AMA umbrella for quite a while. Right now there are good looking new groups forming in nearly every interest category. They are making a very wise move, because they can help in both directions: furthering their own interests and helping AMA help them. This makes our entire modeling structure stronger, "buying our fun some insurance!"

Save Your Brushes. Here is some advice that just might pay off for you in caring for your paint brushes. First, spend a **little more** and buy **better** brushes! Second, take care of your brushes. A little special care will pay off for you in easier and better work. No matter what sort of paint you have been using, when you are through painting wash your brush in the appropriate thinner and then be sure to **wash it in soap and water.** After rinsing well and while still wet, re-shape the bristles to their original contour and let dry. However you let them dry is the shape they will be in when you go to paint again. The reason for washing brushes in soap and water is to remove the residue and paint particles that remain after washing in the regular thinner: there is always some whether you can see it or not. By this special treatment I have some red sable brushes that I have used for 30 years.

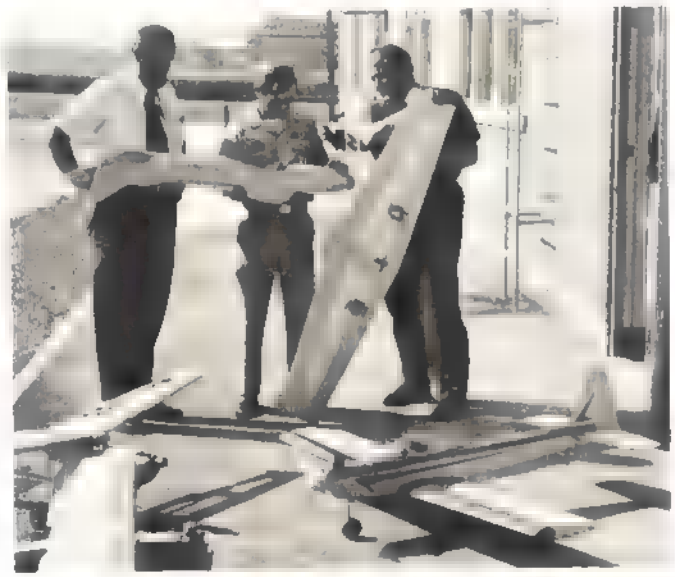
Expanded Plastics. When you start that new modeling project, be sure that you pick the proper expanded plastic material. We have fallen into the habit of calling all expanded plastic "styrofoam." Actually styrofoam is a particular expanded plastic made by two or more ingredients being poured together and allowed to foam up and set. It is an open-cell type. Another type of expanded plastic is commonly called "bead-board" or popcorn-plastic" and is a closed-cell type made by popping tiny pellets of plastic with heat like popcorn, expanding it into a solid mass. Both basic types are very light and very useful in model building. But the use and handling of these two classes of expanded plastics is very different, so make sure you find out about them before you start on your masterpiece.

I wish you happy building and flying, and no problems.

John E. Clemens
AMA President

Photo from District I meeting in May at the University of Massachusetts in Amherst shows organizer Cliff Piper (right), vice-president of the , and John Clemens (left), AMA president. John Worth, executive director, also attended as did most of the district officers. The meeting provided an opportunity for many members to become acquainted with their representatives and to have a better understanding of how AMA works in their behalf.

NEWS bits



This trio of modelers and their planes was featured a while back in the newsletter of the Letterkenny Army Depot—where they all work. L-R: Earl Witt, Major Robert Nier and Orville Thomas. Witt, AMA secretary-treasurer, is chief of the Depot Facilities Division.

Bob Vaughn, center, poses with his ground crew and 7-1/2-ft. wingspan canard (tail-first plane) which he designed for NASA and which is being used to verify the aerodynamics of an 18-ft. version intended to operate [redacted] 70,000 feet. Dubbed the Mini Sniffer Project, the program's goal is to sense and sample effluents produced by aerospace vehicles from ground level to near 100,000 feet. Bob is a member of the Antelope Valley Tailwinds.

Doing It the Hard Way

We hear that a Free Flight competitor at a recent contest launched his gas model and was timed at 3:11, but since the engine fell off the model at shut-off, the flight was recorded as an attempt for having dropped parts. As if this weren't enough, Bob Regan (AMA 63212), editor of the Thermal Thumbers (Calif.) newsletter, goes on to report that the same flyer later snagged his battery leads on the stabilizer and carried them aloft when they tore from the battery terminals. Fortunately for the max flight which ensued, the leads remained on the stab for the entire flight, so that it could be recorded as official—no dropped parts this time!

Sully to the Rescue

Matty Sullivan (Sullivan Products—Pylon Brand), long time friend of modeling and AMA, saw the notice soliciting contributions for restoration of the Jim Walker Trophy and very generously volunteered to underwrite the entire expense. Thanks, Matty!

The trophy was presented many years ago by Jim Walker, now deceased, to be awarded on a perpetual basis to the top National Contest CL Stunt entrant. In the intervening years it had become damaged in shipment to the point that it was no longer a fitting tribute to either the winner or the man whose name the trophy bore—father of Control Line flying, CL and RC Stunt practitioner, and extraordinary modeling showman.

Thanks go not only to Matty for footing the bill but also to Al Rabe, current holder of the trophy, and the Precision Aerobatics Model Pilots Assn. (PAMPA) for organizing the effort. The other contributions that were submitted won't be wasted, by the way: they'll be used for constructing a durable shipping case and extra trophy parts in case they are needed in the future.

Paper Gliders—Fun!

"I have never [redacted] many grown men having so much fun with scraps of paper," commented Larry Rosenberg (AMA 37283), editor of the *Valley Flyers Newsletter*. The California club had a paper airplane contest at one meeting which turned out to be a great success. The winners: Karl Gabel (AMA 97970), most original design; Chuck Smith (AMA 507), endurance; and Ron Clem (AMA 3642), distance.

Eaten [redacted] the Spot!

An unusual gift exchange—"a masterpiece of Christmas entertainment" was tried by the AMA chartered Torrey Pines Gulls (Calif.) and noted in their newsletter, *The Watcha Callit*. The procedure: gifts were placed on the floor and those who had brought gifts drew numbers; then in sequential order guests selected either a wrapped gift or one that had been chosen by another guest. When a gift was taken by this procedure, another was selected by the loser. This round robin continued until someone took [redacted] wrapped gift from the stack. The only constraint on claiming a gift was that no one could have the same gift more than once in a round. The trading was so hectic that at one point a box of candy was eaten right on the spot to insure that no further changes in ownership would occur!

37th Annual Banquet

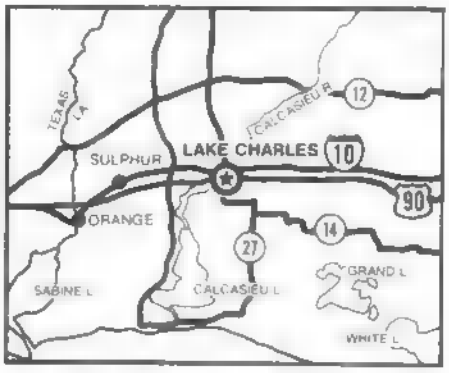
It is interesting that Otto Curth (AMA 6824) and Dushan Deshich (AMA 64005), two of 102 who attended the annual banquet of the AMA chartered Chicago Aeronuts in January, also attended the club's first banquet in 1938. Among those honored for achievement in 1973 were Charlie Sotich (AMA 3187) who (again) won the Raoul J. Hoffman High Point Trophy. Class Awards went to Mindi Linstrum (AMA 33690), Bobby Hayes (AMA 53978), and Bob Watson (AMA 92387), Junior, Senior, and Open, respectively. Entertainment included a film of the NFFS Rubber Speed event at the '73 Nats and a slide program presented by Deshich. Thanks to Pete Sotich (AMA 12) for this report.

National Contest Late Entry Information

More Convenient at Lake Charles than Ever Before

Most Nats contestants already will have entered by the advance entry postmark deadline of July 1, but this year late entries will also be permitted at the contest site for almost the entire 12-day Nats period, August 4 through August 15. Previously late entries were permitted only on the first day; this year the primary requisite for events other than Scale or RC is that late entries be accomplished by 5 pm of the day before an event is scheduled to be first flown- for Scale, no later than 5 pm of the day before models must be turned in for static judging, and for RC, no later than 5 pm of the last day for which transmitter processing is scheduled for a particular event.

The full schedule of event flying, plus Scale turn-in deadlines and RC transmitter processing times, was printed in the June "AMA News" section, AAM page 100. Anyone who thinks he might enter should obtain the 1974 Nats entry form which also includes much other useful information; request from AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005, and please include a preaddressed and stamped (10c) envelope.



Late entries for the Indoor high ceiling events may be made at the site (Goodyear Airship Hangar at Spring, Tex., north of Houston) on August 4 and 5 from 9 am to noon and 1 pm to 5 pm. Late entries for the Indoor low ceiling events and all outdoor events (RC, CL, FF, Scale) may be made at Chennault Airbase, Lake Charles, La., from August 5 through August 13 8 am to noon and 1 pm to 5 pm each day, except also 7 pm to 9 pm on August 5.

Late Basic Entry Fee for Juniors and Seniors is $2 (same as advance fee, and includes entry in two events) and $25 for Open members (no events included). Event fees for late entries, or for events added at the Nats by advance entrants, are $3 per event for all age categories—except RC, which are $7 per event.

Mechanics Fee, advance or late, is $2; provides identification and field access privileges equivalent to contestants. Available to AMA members only. A Nats-only membership is included in the $2 fee for members of a contestant's family.

Nats Housing. University dormitories about three miles from Chennault Airbase are available for three groups: males only, couples, and families. For individuals and couples, the rate is $3 per person per night, double occupancy. For families consisting of more than just a couple—or for groups—a family-type cluster is available at the rate of $6 per person per night, except no charge for children under age 16. Dormitory housing arrangements are made through AMA either in advance by mail or in person at the Nats.

Many campsites for tents and trailers are available on Chennault Airbase for $2

Going to the Nats? Read the Fine Print!

If you wait until you get there it may be too late!

The annual event known as the National Model Airplane Championships is the world's biggest model meet, enjoyed by many hundreds. But there are always some who end up unhappy. In most cases the unhappiness was caused by not taking the time to read available information as to how the events operate and why.

The official entry form is part of the problem. It is complex and full of fine print, so that the natural tendency is to set it aside for later—or maybe never! Yet all that fine print has evolved over the years as a necessary evil, in order to help bring order to what adds up to a lot of complex information.

Unfortunately, as with so many things these days, the entry form and information has become complicated because a few people cause problems by ignoring common sense and fairness concerning the rights and privileges of others. Consequently it has become necessary to impose tight deadlines, restrict some activities, and make all kinds of special rules that normally are not needed at other model meets.

Much of the detail is necessary simply because of the numbers of people involved: typically over 2,000 (counting contestants, helpers, relatives and friends). There are obvious communications problems when dealing with so many, especially when they are dispersed over a huge airfield most of the time. And when an event runs for a week or more, there are many problems involving what is happening from day to day and location to location.

All this is to say that the National Meet, also known as the Nats, is a very complicated operation. But it is mostly a very orderly and enjoyable experience for those who make the effort to be informed. The Nats entry form offers a wealth of information, and particular attention is called here to some details of that information which have been overlooked or ignored by some to their eventual disappointment.

Some people, for example, simply show up at the Nats and expect to be able to participate as contestants regardless of arrival time. Most, however, have learned that advance entry by mail is far easier and significantly cheaper. Others depend upon so-called "late entry" at the Nats, even though they know this is far more expensive. But the saddest situation involves the person who doesn't realize that there are deadlines, varying from event to event, when late entry is possible—and then only until the cutoff time that day.

Cutoff times have been experimented with from year to year, but none of the variations have ever made much difference. Almost always someone shows up a few minutes too late! The deadlines are made as late as practical while still manageable. But the cutoff time is sharp. It has to be that way because experience over many years has shown that, no matter what time was picked, some people tend to wait until the last minute, with considerable disruption to headquarters operations and much overtime work.

This year a special attempt has been made to make requirements easier on contestants, but careful reading of the Nats entry form is still necessary to avoid surprise and possible disappointment. The Nats, which has gotten to be the world's biggest model meet, is manageable only by tight planning and time demands upon all participants. Those in the know don't have problems and enjoy the Nats thoroughly. Those who don't bother to become informed are often disappointed. Disappointment is avoidable and unnecessary—read the fine print!

per day per site. Pay at the Nats. The camp area includes portable toilets but no water or electricity to individual sites.

Nats Meetings. The regular AMA membership meeting as provided in the AMA bylaws is scheduled to be held at Chennault Airbase on Wednesday, August 7, at 6:30 pm; all members are invited. The National Free Flight Society meeting is planned for Thursday, August 8.

The Nominating Committee, open only to AMA vice-presidents or their appointed delegates, will meet at [redacted] pm on Wednesday, August 7. The beginning of this meeting signals the closing time for AMA officer nominations (president and vice-presidents for Districts II, IV, VI, VIII and X) for the 1975-76 term. See the June "AMA News," AAM page 100, for nomination procedures.

Also meeting on August 7 are the Executive Council, 9 pm, and the AMA Contest Boards, 8 pm. These meetings are open, respectively, only to council members and associate vice-presidents, and to Contest Board members.

Check the Nats bulletin board for locations of all of these activities.

Officials. Volunteer workers are expected to be needed at the Nats. An effort to recruit such workers has been in progress for some time, but more volunteers are expected to be needed to replace last-minute drop-outs and to take some of the load from others. Anyone going to Lake Charles and interested in helping out should report to AMA HQ at Chennault Airbase.

Junior Programs. The Testor Corporation and L.M. Cox Mfg. Co., in cooperation with AMA, will be operating special learn-to-fly programs for youngsters at the 1974 Nationals. This is free, and all those who aren't entered in the Nats are invited to participate.

Financial Report

(continued from page AMA 1)

this does not allow for any new projects, and there are several possibilities which may be involved during the year:

a. Additional distribution of the AMA *Monthly Mailing* to all Leader members, including Contest Directors, an increase in circulation of about 1,500. At first-class mail rates that comes to about $1,500 more in postage for the year, plus more for paper and printing, for about a $2,000 total.

b. Possible support money for the World Championships at Lakehurst in July. This could be only about $5,000, but it might go higher if sponsorships and other income items don't pan out as expected. Nothing definite here to warrant pessimism, but the operation requires commitment of large sums without any real guarantees of return. Earlier this year, for example, we put down a deposit for a charter flight to help contestants coming from Europe. The charter was cancelled when not enough people signed up, and AMA lost the deposit money—several thousand dollars worth.

Aside from these items there are two large areas of financial concern. One is basic to the times: inflation and energy problems could cause a situation in which a major decline in activity might result. This is not likely since our activity has always done well during recession or depression times, but if the situation got so that flying was drastically reduced, the need for AMA insurance and other benefits might diminish greatly. The net result could be a severe loss of membership and the accompanying income. So far this isn't happening, but the gasoline shortage earlier this year caused some worries and doubtful moments that could easily return again.

Secondly, there is developing a considerable membership interest and pressure in the idea of acquiring our own property (or long-range lease) for a permanent Nats site and model museum. If we proceed with this thinking a considerable outlay of money could be involved, easily our entire current surplus.

In general, therefore, although there is a surplus on the books, prudence suggests that we should proceed carefully to avoid doing anything to seriously diminish or wipe out the surplus. As large as it is, it is not enough to support AMA operations for very many months—if we had an emergency situation without income.

So the current watchword seems to be 'caution.' Meanwhile we're continuing to think and operate optimistically, so no membership services or benefits are being curtailed. In fact, the budget provides for moderate expansion in all areas. But the consensus of AMA Executive Council opinion, based on previous decisions concerning this year's budget, seems to be one of restraint and reluctance to look on the current surplus as money available to be spent carelessly. Instead, the mood is one of seeing the surplus as a hedge against further inflation and emergency situations--most council members recall that AMA's red-ink days and years of dump-the-deficit campaigns are not so far behind us. The memory of those times is, therefore, acting to temper enthusiasm for new projects until there is a more stable economy.

AMA Secretary-Treasurer Earl Witt set the tone for the current caution at the Executive Council's winter meeting last March. He presented an analysis of AMA income and expense trends during recent years, with projections for the future. His study indicated that mere continuance of AMA's programs into the future on the same basis as in recent years, assuming current inflation effects, would produce an operating deficit within one to three years. This led to some curtailment of the originally proposed 1974 budget, particularly in the area of PR expenses which have increased greatly in the early seventies. It also led to some policy decisions which will affect 1975 budget items.

The general message seems to be that new projects will be financed only out of funds generated by the projects themselves, or that some projects must be paid for by those interested rather than by the membership as a whole. The situation could be changed by continuance of AMA's growth, however, on the basis that this increases the income available.

Fortunately, AMA's current growth is strong, and if it continues steadily we should [redacted] an easing of the worries about what the future holds. In the meantime the AMA financial picture is excellent. So this discussion of cautious optimism is not meant to cast gloom. It is, rather, to show that AMA is in good shape but proceeding warily in an uncertain era.

1974 AMA Budget Estimates

Income:	
Memberships	
7,500 @ $3.00	$ 22,500
615 @ $5.00	3,075
1,860 @ $9.00	16,740
800 @ $10.00	8,000
9,550 @ $12.00	114,600
28,675 @ $16.00	458,800
Contest Sanctions	4,000
Club Charter Fees	26,000
Competition News Subscriptions	12,000
Interest Income	12,000
Supply & Service, Net	5,000
Total Estimated Income	$682,715
Expenses:	
Salaries	$215,352
Rent	11,500
Telephone	6,200
Postage	38,000
Public Relations	26,000
Film Projects	22,000
Insurance	3,800
Legal and Audit	2,600
Membership Processing	53,800
Rule Books	8,400
Member Insurance	25,000
Publications	208,000
FAI Programs	12,000
Miscellaneous Supplies	20,000
Total Estimated Expenses	$652,652
Estimated Income vs. Expense:	
Gain	$ 30,063

(Assumes Nats direct costs will break even.)

RC Team Program Revised

Several changes have been made, subsequent to last month's report of basic details, in this year's program to select the 1975 U.S. RC Aerobatic Team. The number of flyers to be admitted to the Team Finals (at Hutchinson, Kans., October 4-6, 1974) has been increased to 40. The number of pre-qualified flyers to participate in the Team Finals has been increased to 20 by including the top 10 from the 1973 National Contest in addition to the top 10 from the 1972 RC Masters (or actually 11 from the latter because 6th placer Jim Kirkland has since passed away).

The 20 flyers who are pre-qualified: Joe Bridi, Ralph Brooke, Dave Brown, Steve Buck, Ron Chidgey, Don Coleman, Alan Dupler, Steve Ellison, Ed Keck, Dean Koger, Phil Kraft, Don Lowe, Jim Martin, Rhett Miller, Jr., Mike Mueller, Jim Oddino, Norm Page, Bill Salkowski, Bob Smith, Jim Whitley.

Ten flyers still will qualify for the Team Finals by accumulating points at AMA sanctioned Class AA or larger meets from May 4 through September 2, but this has been expanded by including Class C Expert as well ■ Class D Expert events; program flyers in Class D will obtain 10% higher points than corresponding Class C events. Another change in the points part of the program is that the 20 pre-qualifiers will be dropped from contest standings insofar as placing is concerned but counted toward the total number of contestants in the event (both are factors in how many points are earned), except that those placing ahead of ■ program entrant will not be included in the total. Roughly, points are earned if placing is within the upper half of those entered.

The remaining 10 qualifiers will be the top 1974 National Contest Class D flyers who are entered in the program, after excluding the 20 pre-qualifiers. If a '74 Nats qualifier is also entered in the points part of the program, he will be dropped from the points program and another points program entrant substituted.

The result of these changes, which have been approved by the AMA president, is to give more RC Aerobatic flyers a chance to earn a place on the 1975 U.S. World Championships Team. At the same time, many flyers who previously have proved their abilities will not need to show proof again before being allowed to compete in the Team Finals. And by the exclusion of pre-qualifiers in computations for the points part of the program, this will eliminate an adverse condition which might have occurred if a contest attracted a number of pre-qualifiers.

How to Enter the Points Program. Send a $10 program fee (check or money order payable to AMA and identified as for RC Team Program) to AMA HQ, postmarked by August 15, 1974, or pay the fee in person to AMA HQ at the National Contest by August 15. Program entrants must also have an FAI stamp ($1.25 from AMA HQ if not purchased with license).

How to Enter the Nats Qualification Program. A flyer must have the FAI stamp and pay a $10 program fee prior to the start of Nats Pattern flying (in addition to regular Nats fees). Pay at the Nats.

Note: the points qualification program and the Nats qualification program operate independently; the fees for each are separate, and neither can be applied to the other; Nats placing will not count toward the point accumulation program.

Official Sanctioned Contests of the Academy of Model Aeronautics

Note: for quick response and as a favor to those staging, administering and directing the contest, ■ certain to send a stamped, self-addressed envelope along with your request to the listed Contest Director (CD) for additional information.

July 1-7—Lakehurst, N.J. (AAAA) AerOlympics World Championships for CL & RC Scale and Indoor Limited International Contests for RC Pylon Racing and Soaring. Old Timers Nationals, open Indoor contest. Site Lakehurst Naval Air Station Sponsored by Academy of Model Aeronautics, ■ Fifteenth St. N.W., Washington, D.C. 20005

July 2-4—Lakehurst, N.J. (A) Society of Antique Modelers Championships Site Lakehurst N.A.S. E. Woodman CD, 389 Floral Ln., Saddle Brook, N.J. 07662 Sponsor Old Time Eagles MAC

July 4—Fort Meade, ■, 3rd Annual 4th of July Fun-Fly for RC Site Range #5, Fort Meade W. Cislo CD, 575 Rita Dr., Odenton Md. 21113 Sponsor Fort Meade Modelers MAC

July 4—Ledue, Mo. Fourth of July Air Show Demonstration/Entertainment Flying Activity Site St. Louis Country ■ W. Feldmeier CD, 2955 Clearview Dr., Normandy, Mo. 63121

July 6—Chagrin Falls, Ohio (AA) Second Annual ■ Rubber & Jetex Meet. Site Chagrin Falls L. Campbell CD, 9230 Independence Parma Hgts., Ohio 44130 Sponsor Cleveland FF Society

July 6-7—Ft. Walton Beach, Fla. (AA) Jim Kirkland Memorial RC Contest ■ Eglin Air Force Base, Auxiliary Field #4 R. McGraw CD, 43 Weynal Cir., Ft. Walton Bch., Fla. 32548 Sponsor Eglin Aero Modellers.

July 6-7—Omaha, Nebr. (AA) National Multiwing RC Championships Site Omaha ■ Olson ■, 6111 Maple St., Omaha Nebr. 68104

July 6-7—Medras, Ore. ■ Annual N.W. Seaplane Championships Site Haystack Reservoir J. Holcomb CD, 1010 NE 122 Ave. Vancouver ■ ■ Sponsor Portland Sky Knights

July 6-7—Whittier, Calif. (A) Formula I Race for RC Site Whittier Narrows F. Heyer CD, ■ Homage Whittier, Calif. ■ Sponsor ■ ■ Inc

July 6-7—Geneva, NY (A) N.Y.S. ■ Annual RC Fun Fly Championship Site G■■■ D. Bowerman CD, 72 Buffalo St. Canandaigua NY 14424 Sponsor Sky Rovers Flying Club, Inc.

July 6-7—Lexington, Ky. (AAA) Mid-America Championships for CL Site Kearney Field L. McFarland CD, P.O. Box 8177 Lexington Ky. 40503 Sponsor Lexington MAC

July 6-7—Springfield, Mo. (AA) Springfield ■ Club 4th Annual AMA Contest Site SRC Flying Site ■ Langston CD, PO Box 985 Springfield, Mo. ■ Sponsor Springfield RC Club

July 6-7—Pettyville, W.Va. (AA) Vienna Skysharks Annual ■ Contest Site Club ■ S. Sturm CD ■ 5234 Vienna, W.Va. 26105 Sponsor Vienna Skysharks MAC, Inc.

July 6-7—Lexington, S.C. Larks Annual Fun Fly Site Lexington, J. Scharpf, Jr. CD, Rt. 7 Box 271E Lexington, S.C. 29072 Sponsor Lexington Aircraft RC Society

July 7—W. Suffield, Conn. (A) Nor'East Races 74 for RC ■ NCRCC ■ A. Simmonds ■, 145 Irene Dr., RFD #4 Vernon, Conn. ■ Sponsor Northern Conn. RC Club

July 7—Ft. Lewis, Wash. (A) Washington-Oregon ■ Timer Championships Site Harts Lake Prairie ■ Dodd CD, 10848 ■■ Ave. SW Seattle Wash. 98146 Sponsor Boeing Charter Hawks

July 7—Riverdale, Ill. ■ Chicago ■ Masters CL Annual Site Kickapoo Woods M. Booker CD, 15711 Dixie Hwy., Harvey Ill. ■

July 7—Mentor, Ohio (A) M.A.R.C.S. Firecracker RC Classic Site Tyler Blvd. R. Mellen CD, 4729 Orchard ■ Mentor Ohio 44060 Sponsor Mentor Area ■ Society

July 7—Midwest City, ■ (AA) Mid-Summer Rally for CL Site Regional Park ■ Gewain ■, 9710 N.E. 3rd Pl. Midwest City, Okla. 73130 Sponsor Midwest City Prop-Choppers

July 7—Brighton, Wisc. (AA) 14th Illinois Model Aero Club Invitational FAI Contest ■ Outdoor FF Site Bong ■ P. Sotich CD, 3851 W. 62nd Pl. Chicago, Ill. 60629 Sponsor Illinois Model Aero Club

July 13—Middleton, R.I. Static Display and Demo-Flying for 1/2A's Site Shopping Center L. Mylinger CD, 25 Renfrew Ave. Middletown, R.I. 02840 Sponsor CL Aero Modelers of Middletown, R.I.

July 13—York, Penna. (A) 1st Annual Lancaster Area RC SS/ECS! ■ Site York C. Clark CD, RD 2, Minute Dr., Columbia, Penna. 17512 Sponsor Lancaster Area Soaring Society

July 13-14—Corsicana, Tex. (A) Southwest RC Glider Championships Site, Corsicana ■ Darnaby CD, PO Box 1693, Corsicana, Tex. 75110 Sponsor, Corsicana Sky Seekers.

July 13-14—Wallops Station, Va. (AA) M.A.R.K.S. Annual RC Meet Site Wallops Sta. H. Jones CD, 59 Aigburth Ave., Towson, Md. 21204 Sponsor Mid Atlantic ■ Society

July 13-14—Kent, Wash. (AAA) SMA Model Aeronautics FF, CL Scholarship Contest Site Boeing Space Center H. Smith CD, 1417 NW 191 St., Seattle, Wash. 98177 Sponsor Boeing Charter Hawks

July 13-14—Charlotte, N.C. Charlotte Aeromodelers 1/4 Midget & Fun Fly Site Charlotte Aeromodelers Field. D. Burton CD, 5609 Hantana Ave., Charlotte, N.C. 28212 Sponsor Charlotte Aeromodelers

July 13-14—Tullahoma, Tenn. (AA) Airfoilers 15th Annual RC Pattern Contest Site Tullahoma C. Anderson CD, Rt. 4, Box 154, Tullahoma, Tenn. 37388 Sponsor Coffee Airfoilers MAC

July 13-14—Tulsa, Okla. (AA) Tulsa Glue Dobber Silver An■■■■■ (25th) FF, CL Annual Site 41st St., ■ 145 E. Ave. R. Dunham CD, 4730 So. Yorktown, Tulsa, Okla. 47105 Sponsor Tulsa Glue Dobbers

July 13-14—Chelan, Wash. (AA) RAF Chelan RC Air Fair Site Chelan T. Olson CD, ■■■ Manly, Wenatchee, Wash. 98801 Sponsor ■ Wenatchee Red Apple Flyers

July 13-14—Missoula, Mont. SAM's Annual RC Fun Fly Site 2 Miles up Lower Mills Creek G. Pew CD, 3708 North Ave. W., Missoula, Mont. 59801 Sponsor Blue Mountain Aero Modelers.

July 13-14—Endicott, N.Y. (AA) 19th Annual Aeroguidance Society ■ Contest Site Tri-Cities Airport. ■ Noll CD, 8 Seneca Rd., Danbury, Conn. 06810 Sponsor Aeroguidance Society Inc.

July 14—Overland Park, ■, (A) RC Glider Guider's Low Pressure Meet Site Overland Park City Park D. Ellis CD, 8301 W. 92nd St. Overland Park, Kans. 66212

July 14—Alexandria, La. (AA) Alexandria CL Championships Site Alexandria ■ Point CD, 2502 Myland Dr., Pineville La. 71360 Sponsor Flying Pelicans

July 14—Visalia, Calif. Sky Kings Outdoor FF Meet Site Manzanillo Ranch E. Souza CD, 514A S. Bridge, Visalia, Calif. 93277 Sponsor Sky Kings

July 14—Brighton, Wisc. (B) LLAK-NIAMAC Outdoor FF Meet Site Bong Recreation Area W. Morrison CD, 5N307 Hansen Rd. St. Charles Ill. 60174 Sponsor Lily Lake Air Knockers

July 14—Ohio (AA) NOFFA Old Timers FF Contest. ■ite. Pending R. Reuter CD, 4670 Columbia Rd., N. Olmsted, Ohio 44070 Sponsor Northern Ohio FF Association

July 14—Sepulveda, ■ (A) San Valeers FF Monthly July '74 Meet Site Sepulveda, H. Matthies CD, 36019 Oak St., Apt. 30, Lomita, Calif. 90717 Sponsor San Valeers MAC.

July 14—Lockport, N.Y. (AA) United Pylon Racing Circuit Site: Lockport, E. K. Landefeld CD, RD 2, 11151 Jamison Rd., ■ Aurora, N.Y. 14052. Sponsor: Niagara County RC Model Airplane Club, Inc.

July 14—Detroit, Mich (AA) 2nd CL Stunt Clinic. Site Rouge Park A. Adamsin CD, 22454 Fairfax, Taylor, Mich. 48180 Sponsor ■ Strathmoor ■■■ Club of Detroit.

July 14—York, Penna. (A) 3rd Annual ■■■ RC Glider Meet. Site York D. Coughnour CD, RD 2, Red Lion, Penna. 17356. Sponsor, York Area RC Club.

July 14—St. Louisville, Ohio (AA) Licking County RC Club Meet. [redacted]: A. Neithers Farm A. Dupler CD, Box 188, Millersport, Ohio 43064. Sponsor: Licking County RC Club

July 14—New London, Wisc. Clintonville RC Fun Fly Site: New London Airport. J. Vanderwalker CD, Rt 3, Clintonville, Wisc. 54929. Sponsor: Clintonville RC [redacted]

July 14—Hadley, Mass. (A) "Pulled-Up Powerless Planes" RC Meet. [redacted]: Hampshire Co. RC'ers Field. [redacted] Borkowski CD, 32 Lyman [redacted], Easthampton, Mass. 01027. Sponsor: Hampshire County Radio Controllers

July 14—Colorado Springs, Colo. (AA) 1st Annual Pikes Peak RC Glider Meet. Site: Colorado Springs. J. Cole CD, [redacted] Warwick Ln., Colorado Springs, Colo. 80909. Sponsor: Pikes Peak RC Club

July 14—Dansville, Mich. (A) Lansing CARDS 4th Annual RC Soar-In. Site: Moore Farm. T. Kelley CD, 2929 Grandell Ave., Lansing, Mich. [redacted]. Sponsor: Capital Area [redacted] Drone Squadron

July 14—Hempstead, N.Y. (AA) Meroke 10th Annual RC Meet. Site: Hempstead. R. Geyer CD, 913 Washington St., Baldwin, N.Y. 11510. Sponsor: Meroke RC Club

July 14—Auburn, Ind. (A) DeKalb Flying [redacted] (Fun Fly). Site: Auburn. W. Snavley CD, 416 W. 9th St., Auburn, Ind. 46706. Sponsor: The Dekalb Flying Models Club

July 14—Balston Spa, N.Y. (A) Empire State RC Racing. Site: Balston Airport. D. Fifield CD, 11 Lace Ln., Elnora, N.Y. 12065. Sponsor: Thundervolts RC Club

July 14—Wyandotte, Mich. (B) Indian City Fun Fly. Site: Wyandotte. E. Lynn CD, 3167 - 22nd, Wyandotte, Mich. 48192. Sponsor: Indian City RC Club, Inc.

July 14—Jordon, Minn. T.C.R.C. Mini-Air Show for Static & Flight Demonstrations of all aspects of RC miniature aircraft. Site: Scott Co. Fair Grounds. J. Taylor CD, 14126 Garland Ave., Apple Valley, Minn. 55124. Sponsor: Twin City RC'ers

July 14—Des Moines, Iowa (AA) Central Iowa Aeromodelers CL Meet. Site: Fort Des Moines-South. [redacted] Baldus CD, 6719 Colby, Des Moines, Iowa 50311. Sponsor: Central Iowa Aeromodelers

July 14—Westminster, [redacted]. Aero Modelers Exposition for RC & CL Demonstration Flying. Site: [redacted] Fire [redacted] [redacted] Pease CD, 65 E. Main St., Westminster, Md. 21157. Sponsor: Westminster Aero Modelers

July 20—Salem, Ill. (AA) 31st Summertime Airplane Flying Outdoor FF Meet. Site: Salem-Leckrone Airport. J. Bennett CD, 324 Helfenstein Ave., St. Louis, Mo. 63119. Sponsor: Thermaleers Kirkwood

July 20—Omaha, Nebr. (A) M.A.S.S. Monthly Soaring Meet. Site: The Grass Pad. J. Simpson CD, 2636 Forbes, Omaha, Nebr. 68123

July 20—Pike, N.Y. (AA) Western N.Y. FF Society Meet. Site: Pike. D. Evans [redacted], Box 157, Richburg, N.Y. 14774

July 20—Rillton, Penna. RC Sailplane Fly for Fun. Site: Keystone Clippers Field. F. Collins CD, 29 Stewart Ave., Pittsburgh, Penna. 15227. Sponsor: Keystone Clippers

July 20—Jonesboro, Ga. (A) District V P.A.M.P.A. CL Invitational. Site: Tate Stadium. T. Dixon CD, 9025 Hurst Ct., Jonesboro, Ga. 30236

July 20-21—Cincinnati, Ohio (AAA) Pre-Nats CL Championships. Site: Lunken Airport. W. Messerly CD, 1122 Eight Mile [redacted], Cincinnati, Ohio 45230. Sponsor: Queen City U-Control

July 20-21—Menomonee Falls, Wisc. (AA) 4th Annual RC Pre-Nats Warmup. Site: Aero Park Airport. F. Morrissey CD, 14100 W. Park Ave., New Berlin, Wisc. 53151. Sponsor: Milwaukee Flying Electrons

July 20-21—Chattanooga, Tenn. (AA) Tenn. Valley RC Meet. Site: Tenn. Valley Field. J. Wyatt CD, 502 Young Ave., Chattanooga, Tenn. 37405. Sponsor: Tenn. Valley RC Club

July 20-21—Houston, Tex. (A) Houston RC Club Annual [redacted]ing Meet. Site: HRCC Field. H. Stragler CD, 5831 McKnight, Houston, Tex. 77035. Sponsor: Houston RC Club

July 20-21—Fargo, N.D. (AA) 18th Annual [redacted] River Valley CL Championships. Site: F. M. Skylarks Field. [redacted] Olson CD, [redacted] 27th Ave., N. Fargo, N.D. 58102. Sponsor: F. M. Skylarks

July 21—Orlando, Fla. Orlando Ugly Stick Race. Site: RCACF Field. W. Williamson CD, 8300 NW 38th St., Coral Springs, Fla. 33065. Sponsor: Broward County RC Association

July 21—Muncie, Ind. (A) 3rd Annual Muncie Sky Chief Fun Fly. Site: Muncie Reservoir. G. Bussell CD, RR #7, Box 2280, Muncie, Ind. 47302. Sponsor: Muncie Skychiefs

July 21—Lincroft, N.J. (A) 6th Annual RC Soaring Meet. Site: Thompson Park. D. Sarpolus CD, 32 Alameda Ct., Shrewsbury, N.J. 07701. Sponsor: Monmouth Model Airplane Club, Inc.

July 21—Buffalo, N.Y. (AA) United Pylon Racing Circuit Meet. Site: Buffalo. E. K. Landefeld CD, RD #2, 11151 Jamison [redacted], E. Aurora, N.Y. 14052. Sponsor: RC Aircrafters, Inc.

July 21—Lakehurst, N.J. (AA) 2nd Annual East Coast Indoor Contest. Site: Lakehurst N.A.S. [redacted] Cannizzo CD, 20 Outerbridge Ave., Staten Island, N.Y. 10309

July 21—Elsinore, Calif. (AA) Thunderbug Summer Fling for FF. [redacted] Lake Elsinore. J. Ferrer, 8100 Rayford Dr., Los Angeles, Calif. 90045. Sponsor: Thunderbugs

July 21—Montezuma, Iowa (A) Sig Pylon Races. Site: Sig Field. M. Hester CD, 401 S. Front St., Montezuma, Iowa 50171

July 21—Orlando, Fla. Orlando Meet for Ugly Stick Race. [redacted] RCAF Field. W. Williamson CD, 8300 NW 38th St., Coral Springs, Fla. 33065. Sponsor: RC Assn. of Central Florida

July 21—Warren, Ohio Skyhawks 4th Annual Fun Fly. Site: Warren. M. Waggoner CD, 1947 Salt Springs Rd., Warren, Ohio 44481. Sponsor: Skyhawks RC Club

July 21—Blaine, Minn. (AA) Annual Summer [redacted] Meet. Site: Hentges Sod Farm. [redacted] Monson CD, 131 W. Wentworth, W. St. Paul, Minn. 55118

July 22-26—Lockport, Ill. (AA) 5th RC Soaring Nationals. Site: Lewis University. D. Pruss CD, [redacted], Plainfield, Ill. 60544. Sponsor: Silent Order of Aeromodeling by Radio

July 27—Rochester, N.Y. (A) Upstate New York CL Combat Championships. Site: Rochester. C. Boyer CD, 12 Parkwood Ln., Penfield, N.Y. 14526. Sponsor: Monroe County Circle Burners

July 27—Cody, Wyoming (A) Cody Fun Fly. Site: Cody. W. Higgins CD, 305 S. Day, Powell, Wyoming 82435. Sponsor: Wyoming Sagebrush Hoppers

July 27-28—Homewood, [redacted]. (AA) 7th Annual [redacted] SAC [redacted] Site: 183rd & Central. [redacted] Zinkel CD, 406 Streff [redacted], Glenwood, Ill. 60425. Sponsor: S.A.C.

July 27-28—Raleigh, N.C. (A) Mid-Summer RC Fun Fly. Site: Raleigh. [redacted] Franklin CD, Rt. 6, Box 189, Durham, N.C. 27703

July 27-28—Greenwood, S.C. (A) Annual Piedmont Fun Fly. Site: Greenwood Airport. L. Nash CD, 403 Lavista Pl., Pendleton, S.C. 29670. Sponsor: Greenwood Radio Aircraft [redacted]

July 28—Lancaster, Ohio (AA) F.O.R.K.S. Annual Pattern Event. Site: Lancaster. J. Slater CD, [redacted] Forest Rose Ave., Lancaster, Ohio 43130. Sponsor: F.O.R.K.S.

July 28—Fresno, Calif. (A) FGMAC Monthly [redacted] Meet. Site: Fresno. F. Ginder, Jr. CD, 5740 E. Ashlan, Fresno, Calif. 93727. Sponsor: Fresno Gas [redacted] Club

July 28—W. Suffield, Conn. (A) Nor'East Air RC Races '74. Site: NCRCC Field. R. Berner CD, 761 Mather St., Suffield, Conn. 06078. Sponsor: Northern Conn. [redacted]

July 28—Felton, Dela. (A) ECSS Thermal Soaring Contest. Site: Felton. G. Dorney CD, 107 Silver Lake Dr., Dover, Delaware [redacted]. Sponsor: Dover Mosquitoes

July 28—Green Bay, Wisc. [redacted] Green Bay R.U.F. Club Annual Summer [redacted] Site: Suamico Airport. A. Janelle CD, 333 S. Jackson, Green Bay, Wisc. 54301

July 28—Wyandotte, Mich. (B) Indian City Air-Show. Site: Wyandotte. E. Lynn [redacted], 3167 - [redacted], Wyandotte, Mich. 48192. Sponsor: Indian City RC Club

July 28—Newtown, Penna. (AA) Sky Pirate CL Meet. Site: Core Creek Park. T. Kerr CD, 7624 Lexington Ave., Philadelphia, Penna. 19152. Sponsor: Philadelphia Sky Pirates

July 28—Buffalo, N.Y. (AA) United Pylon Racing Circuit Meet. Site: [redacted] E. K. [redacted] Rd. #2, 11151 Jamison Rd., E. Aurora, N.Y. 14052. Sponsor: RC Aircrafters, Inc.

July 28—Aurora, [redacted] (A) MMM Monthly FF Meet. Site: E. Colfax Air Park. [redacted] Larrabee [redacted] 3203 [redacted] Saratoga, Englewood, Colo. 80110. Sponsor: MMM

July 28—Waco, Tex. [redacted] LSF RC [redacted] Site: Waco, Tex. D. Amburn CD, 1805 S. 43rd, Temple, Tex. 76501. Sponsor: Heart O'Texas Miniature Airplane [redacted]

Aug. 3-4—Freeland, Mich. (A) SVRCC 2nd Annual RC Scale Model Air Show. Site: 2220 Lane [redacted] Coates CD, 4016 E. St. Andrews, Midland, Mich. 48640. Sponsor: Saginaw Valley [redacted] Club

Aug. 4—Jamestown, N.Y. Flying Rebels Fly for Fun. Site: Blanchard Road. E. Ecklund CD, 75 Benson St., Jamestown, N.Y. 14701. Sponsor: Flying Rebels

Aug. 4—Livermore, Calif. [redacted] S.A.C.R.C. Picnic Scale Meet. Site: Hummingbird Haven. D. Franco CD, [redacted]66 Mauna Loa Pt. Dr., Fremont, Calif. 94538. Sponsor: Southern Alameda County Radio Controllers

Aug. 4—Rancho Cordova, Calif. (AA) Northern Calif. FF Council Monthly Meet. Site: Wagel Field. K. Oliver CD, 2213 El Canto Cir., Rancho Cordova, Calif. 95670. Sponsor: Capitol Condors

Aug. 4—Bloomfield, Ohio T.C.R.C.M. Fun Fly. Site: Bulek Field. [redacted] Flavell [redacted] 278 Clifton Dr., Warren, Ohio 44484. Sponsor: Trumbull County RC [redacted]

Aug. 4—Rochester, Minn. [redacted] RAMS 1/4 Midget Air Races. Site: Rochester. H. Wayne CD, 1706 7th St. [redacted] Rochester, Minn. 55901. Sponsor: Rochester Aero Model Society

Aug. 5-16—Lake Charles, La. (AAAA) National Model Airplane Championships for [redacted], CL, RC and Indoor events. High ceiling [redacted] door events at Spring, Tex., Aug. 4-5. For entry form and information, send request with pre-addressed and stamped envelope to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005

Aug. 10—Hamburg, N.Y. Fun Fly Meet. Site: Hamburg. K. Landefeld CD, 11151 Jamison Rd., E. Aurora, N.Y. 14052. Sponsor: RC Aircrafters, Inc.

Aug. 10-11—Great Falls, Mont. (AA) 6th Annual Fun Fly. Site: Great Falls. [redacted] Jones CD, 1425 80th Ave., S., Great Falls, Mont. 59401. Sponsor: Big Sky RC Modelers

Aug. 10-11—Dallas, Tex. (A) Dallas League of Silent Flight 2nd Annual Thermal Soaring Gaggle. Site: Mesquite Field. T. Williams CD, Box 1012, Irving, Tex. 75060. Sponsor: Dallas League of Silent Flight

Aug. 10-11—Wyandotte, Mich. (B) I.C.R.C. Annual Contest. Site: Wyandotte. E. Lynn CD, 3167 - 22nd, Wyandotte, Mich. 48192. Sponsor: Indian City RC [redacted], Inc.

Aug. 10-11—Minneapolis, Minn. (AA) Twin City Radio Control [redacted] Annual Contest. Site: Minneapolis. L. Neuman CD, 4916 30th Ave. S., Minneapolis, Minn. 55417. Sponsor: Twin City Radio Controllers

Aug. 10-11—Great Falls, Mont. (AA) 6th Annual Fun Fly. Site: Great Falls. [redacted] Jones [redacted] 1425-80th Ave. D., Great Falls, Mont. 59401. Sponsor: [redacted] Sky RC Modelers

Aug. 11—Hadley, Mass. (A) Sport Scale & Fun Fly. Site: Hampshire Co. RC'ers Field. S. Sparrow CD, 41[redacted] St., Agawam, Mass. 01001. Sponsor: Hampshire County Radio Controllers

Aug. 11—Cowley, Wyoming (AA) Cowley RC Glider Meet. Site: Cowley. W. Higgins CD, 305 S. Day, Powell, Wyoming 82435. Sponsor: Wyoming Sagebrush Hoppers

Aug. 17—Moundsville, [redacted] Va. [redacted] Valley I.F.O.'s Annual RC Contest. Site: [redacted] Timber Lane. A. [redacted], Jr. CD, Rd. [redacted], [redacted] 383, Moundsville, W.Va. 26041. Sponsor: Valley I.F.O.'s M.A.C.

Aug. 17-18—Cedar Rapids, Iowa (AA) Skyhawks 6th RC Meet. Site: Seminole Valley Park. J. Finn CD, 36 Hampden [redacted], Cedar Rapids, Iowa 52402

Aug. 17-18—W. Suffield, Conn. (AA) New England [redacted] Pattern Championships. Site: NCRCC Field. S. Griswold CD, Cottage St., New Hartford, Conn. 06057. Sponsor: Northern Conn. RC Club

Aug. 17-18—Lakehurst, N.J. World War II Scramble for [redacted] Site: Lakehurst. D. Meier CD, 61A North Place, Flemington, N.J. 08822

Aug. 17-18—Birmingham, Ala. (AA) First Annual BAMA Flyers RC Contest. [redacted] Birmingham. F. Newman CD, Rt. 12, Box [redacted], Birmingham, Ala. 35215. Sponsor: Birmingham Aero Modelers Assoc.

Aug. 17-18—Oilville, Va. (AA) R.A.R.C. Annual Pattern/Scale Meet. Site: Club Field. O. Robelen CD, 327 Selden [redacted], Newport News, Va. 23606. Sponsor: Richmond Area RC, Inc.

Aug. 17-18—Tullahoma, Tenn. (AA) 15th Annual [redacted] Air-foilers FF Meet. Site: Tullahoma. [redacted] Cleveland CD, [redacted] County Club Dr., Tullahoma, Tenn. 37388. Sponsor: Coffee Air Foilers

Aug. 18—Johnsville, Pa. (AAA) 27th Annual Eastern States FF & CL Championships. Site: Warminster N.A.F. R. Leishman CD, 167 Goldenridge Dr., Levittown, Penna. 19057

Aug. 18—Southern Calif. (A) San Fernando Valley Silent Fliers Bi-Monthly Meet for Aerobatics. Site: [redacted] be announced. [redacted] Jones CD, [redacted] Farralone Ave., Canoga Park, Calif. Sponsor: San Fernando Valley Silent Flyers

Aug. 18—Olean, N.Y. (AA) United Pylon Racing Association Meet. Site: Olean. B. Brown CD, 1255 High St., Bradford, Pa. 16701

Aug. 18—Ohio (AA) NOFFA August FF Meet. Site: Pending. J. Robinson CD, 195 Fairfield [redacted], Avon Lake, Ohio 44012. Sponsor: Northern Ohio FF Association

Aug. 18—Fresno, [redacted]. (A) FGMAC Monthly FF Meet. Site: Fresno. [redacted] Ginder, Jr. CD, 5740 E. Ashlan, Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club

Aug. 18—Casco, Mich. (A) Pylon Racing Meet. Site: RCCD Field. [redacted] Mottin CD, 2124 Common Rd., Warren, Mich. 48092. Sponsor: RC Club of Detroit

Aug. 18—Colorado Springs, Colo. (AA) Pikes Peak Pattern [redacted] Sport Scale Meet. Site: Colorado Springs. J. Cole CD, 2007 Warwick Ln., Colorado Springs, Colo. 80909. Sponsor: Pikes Peak RC Club

Aug. 18—Dallas, Tex. (AA) 4th Annual FF Pearl Bash Picnic. Site: Dallas. [redacted] Nelson [redacted], 2908 Lanette, Arlington, Tex. 76010. Sponsor: Dallas Cliff Cloud Climbers

Aug. 18—Lapel, Ind. (A) 1st Annual Lapel RC Fun Fly. Site: Club Field. [redacted] Watson, Jr. CD, RR#3, Box [redacted], Anderson, Ind. 46011. Sponsor: Lapel RC Flying Modellers

Aug. 18—Denver, Colo. (A) MMM Monthly FF [redacted] Site: Denver. W. Baldridge CD, 1464 S. Lafayette St., Denver, Colo. 80210. Sponsor: Magnificent Mountain Men

Aug. 18—Brighton, Wisc. (AA) Bong Eagles FF Contest. Site: Bong Field. [redacted] Wisniewski CD, 1536 E. Tripoli Ct., Milwaukee, Wisc. [redacted]. Sponsor: Bong Eagles

Aug. 24—Omaha, Neb. (A) M.A.S.S. Monthly Soaring [redacted]et. Site: The Grass Pad. J. Simpson CD, 2636 Forbes, Omaha, Neb. 68123

Aug. 24—Cudahy, Wisc. (A) 2nd Midsummer RC Soar-In. Site: Warnimont Park. G. Fornary CD, 220 7th St., Racine, Wisc. 53403. Sponsor: Milwaukee Flying Electrons, Inc.

Aug. 24-25—Pearl City, Hi. (AA) 2nd Annual Hawaii UC Championships. Site: Pearl Harbor Park. [redacted] Clough CD, 318-B Millett St., APO San Francisco, Calif. 96557. Sponsor: Hawaii CL Club

Aug. 24-25—St. Charles, Mo. (AA) McDonnell RC Seventeenth Annual Meet. Site: McDonnell-Douglas Electronics. W. Feldmeier [redacted], [redacted] Clearview Dr., Normandy, Mo. 63121. Sponsor: McDonnell RC Club

Aug. 24-25—Anderson, S.C. (AA) South Carolina State Championships for RC. Site: Anderson S.C. Airport. L. Nash CD, 403 Lavista Place, Pendleton, SC 29607. Sponsor: Tri County RC Flyers

Aug. 24-25—Cleveland, Ohio (AAA) 39th Cleveland Junior CL Air Races. Site: Cleveland Hopkins CL Flying Field. R. Sargent CD, 1694 Wright Ave., Rocky River, Ohio 44116

Aug. 24-25—Orange, Mass. (A) 21st Annual NERCM Contest. Site: Orange Airport. W. Army CD, 15 Rhodes St., Millbury, Mass. 01527. Sponsor: New England RC Modelers

Aug. 24-25—Salt Lake City, Ut. (A) Lucky 13th Annual RC Summer Festival. Site: Saltair Model Port. D. Roper CD, 3914 W. 4955 S., Salt Lake City, Ut. 84118

Aug. 24-25—Omaha, Nebr. (AA) Omahawks Annual RC Meet. Site: Omahawks Field. R. Hess CD, 11720 Ceder, Omaha, Nebr. 68114

Aug. 24-25—Fountain Valley, Calif. (B) 1974 LSF Tournament. [redacted] Mile Square. [redacted] Hanon CD, 1042 Embury St., Pacific Palisades, Calif. 90272. Sponsor: San Fernando Valley Silent Fliers

Aug. 25—W. Suffield, Conn. (A) Nor'East Air Races '74. Site: NCRCC Field. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: Northern Connecticut RC Club, Inc.

Aug. 25—Lakehurst, N.J. (AA) [redacted] RC Pattern Championships. Site: Lakehurst N.A.S. J. Friend CD, 62 Joysan Terr., Freehold, N.J. 07728. Sponsor: Monmouth M.A.C.

Aug. 25—LaSalle, Mich. (A) Hobby Stop Silver Cup 1/4 Midget Meet. Site: Toledo Weak Signals Field. B. Mallory CD, 446 River Rd., Toledo, Ohio 43614. Sponsor: Weak Signals, Flying Tigers

Aug. 25—Chardon, Ohio (A) CRC 3rd Annual Glider Meet. Site: Chardon. F. Sheplavy CD, 36981 S. Lakeshore Blvd., Eastlake, Ohio 44094

Aug. 25—Hamburg, N.Y. Flying Knights 5th RC Fun Fly. Site: Hamburg Recreation Center. N. McCormack CD, 5709 Hillcrest [redacted], Boston, N.Y. 14025. Sponsor: Flying Knights of Hamburg, N.Y. Inc.

Aug. 25—Dansville, Mich. C.A.R.D.S. of Lansing Mich. RC Fun Fly. Site: Dansville. B. Bailey CD, 800 Eugenia St., Mason, Mich. 48854. Sponsor: Capital Area Radio Drone Squadron

Aug. 25—Queens, N.Y. (AAA) Association of MAC Greater N.Y. CL Meet. Site: Flushing Meadow Park. P. Bianchini CD, 260 S. Broadway, Yonkers, N.Y. 10705

Aug. 25—Elkgrove Village, Ill. (A) CPC Pylon Race. Site: Chicagoland Field. B. Browning CD, 18 Linden Ave., Wheeling, Ill. 60090. Sponsor: Chicago Pylon Club

Aug. 25—Rice Lake, Wisc. (AA) Hawk 2nd Annual Summer FF Contest. Site: Barron [redacted] Campus. F. Kelley CD, 20 Phipps Ave., Rice Lake, Wisc. 54868. Sponsor: Hardscrabble Hawks MAC

Aug. 25—Brockport, N.Y. (AA) Alvin R. Grant Sailplane Meet. Site: Brockport. R. Walder CD, 27 Folkside Ln., Fairport, N.Y. 14450. Sponsor: RC Club of Rochester

Aug. 25—Ft. Wayne, Ind. (A) First Annual Stand-off Scale Jamboree. Site: Ft. Wayne. J. Spallone CD, 7716 Penmoken [redacted], Ft. Wayne, Ind. 46819. Sponsor: Fort Wayne Flying Circuits

Aug. 25—Lincoln, Nebr. (AA) Aero-Design 7th Annual UC Contest. Site: Humane Society Park. D. Reiber CD, Rt. 8, Lincoln, Nebr. [redacted]

Aug. 25—Framingham, [redacted]ass. (A) Charles River Glider Contest. Site: Callahan State Park. J. Peghiny CD, 2202 Comm. Ave., Auburndale, Mass. 02166. Sponsor: Charles River Radio Controllers

Aug. 31-Sept. 1—Jacksonville, Fla. (AAA) District Five Championships. Site: Jacksonville. A. Wright CD, 5882 Alpha Ave., Jacksonville, Fla. 32205. Sponsor: RC Club of Jacksonville

Aug. 31-Sept. 1—Anderson, Ind. (AA) 3rd Annual Mid Western RC Championships. Site: Anderson Municipal Airport. S. Darlington CD, 3402 E. 6th St., Anderson, Ind. 46012. Sponsor: Madison County RC Flyers

Aug. 31-Sept. 1—St. Paul, Minn. (A) 3rd Annual Pylon & Scale Contest. Site: St. Paul RC [redacted]. LaBrash CD, 2590 Cohansey St., Roseville, Minn. 55113. Sponsor: St. Paul Radio Controllers, Inc.

Aug. 31-Sept. 1—Orwell, Ohio (AAA) Third Annual FF Meet. Site: [redacted] L. Campbell CD, 9230 Independence, Parma Hgts., Ohio 44130. Sponsor: Cleveland [redacted] Society

Aug. 31-Sept. 1—Billings, Mont. (AA) 8th Annual Montana RC Championships. Site: B.F.M. Flying Field. [redacted] Wilson CD, 3225 Phillip, Billings, Mont. 59101. Sponsor: Billings Flying Mustangs

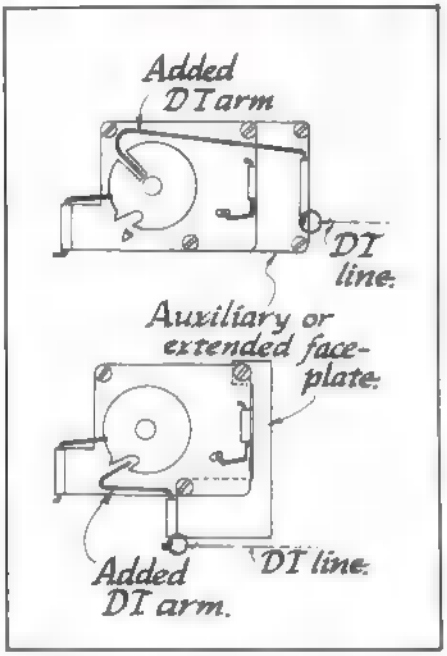
AMA OFFICER DIRECTORY

The most recent complete directory was published in the May *AAM*, page 113.

MEUSER ON FF

(Continued from page 96)

tems require the use of a flood-off timer. The line-pinching type of timer would not work, as there could be no delay between the engine cut-off and the dethermalizer action.



The system shown in the upper sketch is one used by Bill and Bob Hunter, according to *The Dope Bucket*, newsletter of the Utah State Aeromodelers. It requires the addition of a notch in the timing disc, deeper than the original notch. The lower sketch shows the system used by Earl Thompson for many years. It utilizes the original notch for both engine cut and dethermalizer actuation.

MODELER MAIL

(Continued from page 8)

so far (used up four), and I'm quite pleased with them. I built two using Ace's rudder elevator system with their R/O (rudder only) units—beautiful! I use three 500 mah NiCads to power the planes. I can hold them in a 15 + mph wind, but it's a fight.

David King
Worthington, Ohio

Glowdriver

I consumed the article on the AAM Glowdriver with a voracious appetite, but somewhere between the courses I failed to find any type number for the transistors and diodes, X_1 to X_{11} and diodes D_1 to D_{13}.

I might expect that these parts would not be detailed if this were only a sales article, but page 57 says "Here's how to build an AAM Glowdriver."

I would appreciate further information.

Robert W. Kennedy
East Meadow, N.Y.

All transistors are general purpose types. Run-of-the-mill Radio Shack parts (as indicated on page 96 of July '74 AAM) do fine. Any ordinary diodes also work fine. Use the cheapest you can find, but check for correct polarity with an ohmmeter. Specific manufacturers' parts numbers are really not needed, and therefore, weren't indicated.

We neglected to specify which diodes go where in the "Glowdriver." The LED, Zener D-9 (9 volt) and D-10 (4 volt) should be clear. Use 1 amp diodes for D-1 through D-8, plus D-12 and D-13.

D-11 is a three-amp "crowbar" which idiot-proofs the unit by destroying the glow plug, instead of transistors, should you hook up the Glowdriver battery leads. Also, we discovered that electrolytic capacitor C6 is 25 mf, not .25 as shown on parts list.

—Hobie Steele

IS ANYONE LISTENING?
DO YOU HAVE SOMETHING IMPORTANT TO SAY?
ARE THERE STILL UNANSWERED QUESTIONS IN YOUR LIFE?
WRITE THE EDITOR
% American Aircraft Modeler
733 Fifteenth Street, N. W.
Washington, D. C. 20005

ACADEMY OF MODEL AERONAUTICS, 806 Fifteenth St., N.W., Washington, D.C. 20005

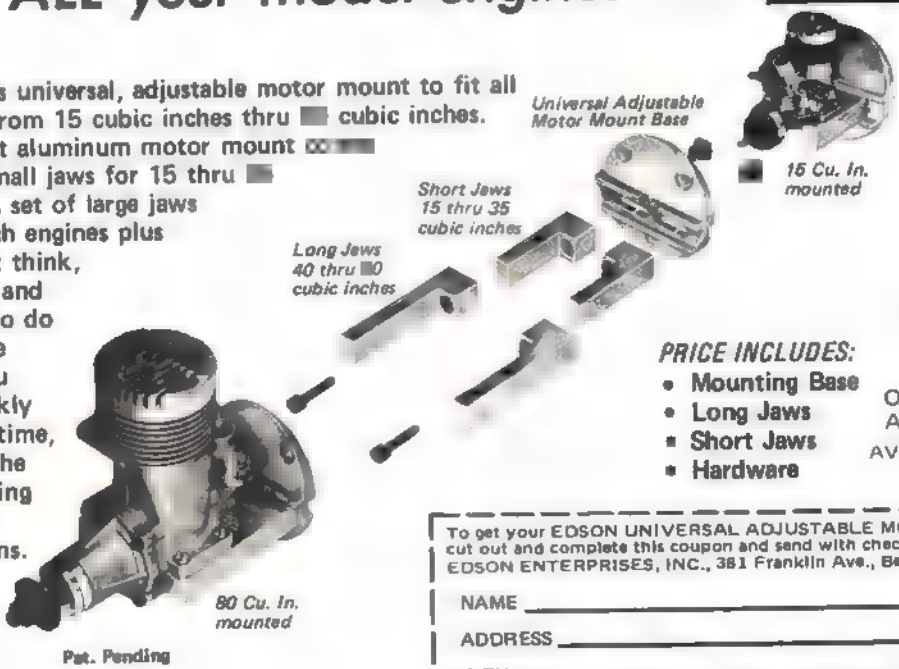
Over 30,000 **American Aircraft Modeler** readers currently receive their magazine as members of the Academy of Model Aeronautics. If you are not yet one of these readers enjoying the benefits of AMA membership, use the card below to join the world's largest sport aviation organization. In addition to receiving **American Aircraft Modeler**, you will:

1. Be protected for up to one million dollars against liability claims arising from accidents caused by operation of model planes, cars, boats, or rockets.
2. Receive special bonus offer coupons for free or bargain priced model aircraft products: books, accessories, samples, catalogs, and many other items. The coupons alone have a value several times the membership cost.
3. Be represented before national agencies and organizations which control or can affect model activities, e.g., the Federal Aviation Administration, the Federal Communications Commission, the Federation Aeronautique Internationale, the National Aeronautic Association, and many others. The fact that there are exclusive frequencies for radio control flying is due to AMA efforts in past years. The AMA Frequency Committee continues these efforts.
4. Be eligible to participate in events sanctioned by AMA such as: flying contests, fun flys, record trials, etc. Over 1000 such events were held across the country in 1973.
5. Receive monthly AMA news detailing activities of individuals and clubs, national and international news, a calendar of events (showing date, location, and type of activity, person to contact for more information), actions of special AMA committees, and many more items pertaining to what's happening in model aviation.

USE THIS COUPON NOW TO ENJOY THESE BENEFITS AS SOON AS POSSIBLE.

This is it! **A revolutionary motor mount for ALL your model engines from Edson**

Edson has developed this universal, adjustable motor mount to fit all model airplane engines from 15 cubic inches thru [illegible] cubic inches. The Edson hardened cast aluminum motor mount [illegible] supplied with a set of small jaws for 15 thru [illegible] cubic inch engines and a set of large jaws for [illegible] thru 80 cubic inch engines plus necessary hardware. Just think, no [illegible] messy drilling and fitting that you've had to do in the past and with one Edson motor mount you [illegible] change engines quickly and easily... saving you time, labor and money. Plus the added feature of mounting your engine in any one of 360 different positions. Full instructions are included with each kit.



Pat. Pending

ONLY $11.95

PRICE INCLUDES:
- Mounting Base
- Long Jaws
- Short Jaws
- Hardware

OFFER EXPIRES AUGUST 30, 1974

AVAILABLE THROUGH YOUR DEALER

To get your EDSON UNIVERSAL ADJUSTABLE MOTOR MOUNT KIT cut out and complete this coupon and send with check or money order to EDSON ENTERPRISES, INC., 381 Franklin Ave., Belleville, N.J. 07109.

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

Number of [illegible] _____

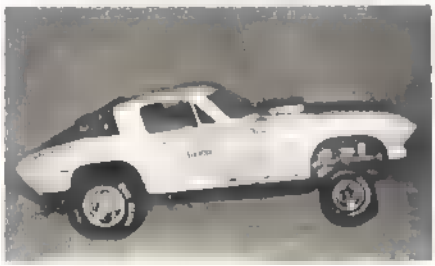
Edson ENTERPRISES INC.
381 Franklin Avenue
Belleville, N. J. 07109
Tel. - (201) 751-2615

DEALERS WELCOME

Watch for . . . NEW PRODUCTS from EDSON

UNLIMITEDS ARE HERE

(Continued from page 47)



This unobtrusive looking machine lays rubber for 30 feet.

to dissipate the heat. A three-bladed prop, cut down to fit in the frame, draws air through the radiator to cool it. The fan prop is driven by the main shaft. From the radiator the coolant is pumped to the engine, then back into the coolant tank and recycled again. The coolant consists of 50 percent boiled water (boiled water has less sediment in it to clog the pump), 50 percent permanent antifreeze (the antifreeze lubricates the pump).

The tires on the rear are modified Cox slicks. I drilled a hole in the wheel and inserted a piece of plastic tubing for a stem, making the tires inflatable. Experimenting with different tire pressure gives way to desired traction. I use my own traction compound, formulated from liquid belt traction and rosin, with a little bleach and alcohol. I call it QUADRATRACTION, and it increases traction by about 25 percent. The front tires are also from Cox. They're modified too. I had to drill them out and insert a bronze race bearing in them so the plastic wouldn't wear.

Right now I have a handful of friends that are possibly interested in having a car built for them. My prime idea is to form a club in this field of racing. As with any new approach or idea, the hardest part is getting it off the ground, and with the cars I have built so far, I think I'm off the ground. This field of racing is wide open, as far as engine size, gearing, tires and classing of events.

The performance of the cars is slightly short of astronomical. From a stand still, the cars will lay rubber for about 10 yards. Since the front end is off the ground for this inordinately long distance, control is a problem. A scale quarter mile drag (165 feet) is currently at 5.6 seconds, but much time is still lost on acceleration. On a standard track, the car handles well. Being heavier, cornering and handling are really solid. Seeing this car perform is a real joy.

I'd certainly be glad to hear from anyone interested in building an unlimited. I think that there is real potential here for a class of car that can add a total dimension to racing. Drop me a line at 37 Conant Street, Bridgewater, Mass. 02324. Let's get out there and race!

ORDER THE PLANS
FOR YOUR NEXT MODEL
FROM OUR PLANS SERVICE
SEE PAGE ■

TESTS/MERCO 61

(Continued from page 40)

Engine didn't come with a muffler. This gave me the opportunity to test the Du-Bro Muff-L-Aire. I bought one labeled for the Webra 61. Then drilled the bolt holes in the plates slightly larger and it fit perfectly. I used all 10 plates that came with the muffler. On ■ 11 x ■ prop, the engine turned 12,500 with the muffler and 13,200 without. The power curve shows good power from 10 to 14,000 plus rpm.

The intake opens at 30° ABDC and closes at 75° ATDC for ■ intake duration of 225°. Induction ■ 180-190° on most engines. Herb Stockton set up ■ of our Team Race diesels this way in 1966 and we noticed ■ combination of long intake duration coupled with a restricted carburetor produced startling results. I don't know if the intake timing on this engine was intentional. It is the result of drilling the hole in the crankcase housing for the carburetor: the hole was drilled to intersect the crankshaft hole, whereas in most engines, ■ carburetor hole is drilled a shorter distance into the housing and the casting itself determines the dimensions of the intake port. At any rate, the engine runs and throttles normally in the test environment.

A reminder: I recommend every new engine be carefully taken apart and checked for cleanliness or any other problems you may find before that first run. I found small metal bits inside the engine and carburetor and two large bronze shavings in the oil slots in the conrod. I know we ■ believe every new engine should come to us in perfect condition. Even if that would happen (not likely) I'd still have to satisfy the "what's it like inside" urge we ■ have. So take advantage!

TESTS/FUTABA 4P-2D

(Continued from page 41)

containing 73 transistors, 13 diodes ■ 79 resistors. The other contains the bridge circuit and is designed to handle 500 ma of output current for the motor. The resulting servo action ■ the smoothest we've seen. Current drain is extremely low ■ idle being 6 ma. on the ones we tested.

BATTERY PACK: The airborne system operates on four AA pen cells. Akaline cells should ■ used.

OVERALL IMPRESSION: A very good radio. There's ■ lot of quality built in and my feelings ■ the servo are obvious. One criticism; the connectors appear frail and ■ not easy to plug together, but nor have they failed.

TESTS/THE GRYHON SHRIEK

(Continued from page 41)

need a 2' ■ 6' building board. The fin, motor mount and fusetage unit on the Shriek is the most time consuming part of the construction. There is some balsa laminating required, and the throttle linkage must be installed through several construction stages.

The Gryphon was finished with K&B Super Poxy on the fuse/fin, and the wing was covered with Solarfilm. The Shriek was covered entirely with Kwik Cote.

Power for the Shriek is provided by ■ Webra 40. A radio with very small servos is a real asset. The pitch control servo slides the roll servo on rails for the elevon operation. These fuselages are not exactly cavernous.

The most pleasant surprise was when it came time to fly. The Shriek is ■ of the grooviest airplanes around, and is one of the most fascinating planes to ■ fly. Its only pecularities are the transition from low to high power while flying, which causes the nose to dip considerably.

EK LOGICTROL LRB

(Continued from page 41)

CRITICISMS: During flight tests, the servo connector (fourth channel) was found to disconnect under vibration unless the recommended "keeper" was used. The servo output arms have only ■ hole on each side. The use of separate receiver/decoder and servo amplifier boards makes for a rather cluttered brick unit, with many wires running in all directions. Of course, unless you are evaluating ■ set, you, the user, see only a neat and easy-to-use package.

INDEX TO ADVERTISERS AUGUST 1974

GUESS WHO?
Stay tuned to AAM!

QUALITY HOBBY SHOPS

Quality Hobby Shop spaces are sold on a six-month basis at $7.00 per month, payable in advance. All insertions must be consecutive. No mention of mail-order business is permitted. Closing Date: 10th of month preceding month

MASSACHUSETTS—CAMBRIDGE, WELLESLEY
Model planes, motors, railroads, ships, radio control equipment and accessories, and racing supplies. Open 10 to daily, 9:30 to 6 Sat.

CROSBY'S HOBBY CENTRES
1704 Mass. Ave., Cambridge 547-4389
Jct. 16 9, Wellesley 235-2486

ARIZONA—PHOENIX (SUNNYSLOPE)
Headquarters for Radio Control Equipment—Kits—Motors—Retractable Gear—Fuel—Complete line of U/C, F/F, Rockets, R/C Boats & Cars, etc. If you want, we build your Radio Control Plane. Built-up R/C Planes in stock. "We give help in your building." Hours—Weekdays, 10-9; Sunday, 9-2.

ACE HOBBY AND CRAFT SHOP
942 W. Hatcher Rd.
Phoenix, Arizona 85021

OHIO—CLEVELAND
We carry the most complete line in Ohio for your model airplane hobby. Also large HO train department. Boats, R/C, motors, parts, supplies, dope, balsa, tools, books, magazines, etc.

NATIONAL HOBBY, INC.
5238 Ridge Road (216) 749-4750

OREGON—PORTLAND
Portland's Headquarters for Radio Control Equipment, all major brands all at discount prices. "Shop American." "The Friendly Shop."

AMERICAN PET MODEL AIRPLANE SUPPLY COMPANY
4308 S.E. King Rd.
In the Disco Mart Shopping Center
Ph. 654-8777 p: 97222

HONG KONG—KOWLOON
The most complete stock of aeromodeling and hobby supplies in the Far East. Sole agents for Graupner, O.S. and Min-X and agents for Vernon, Frog, Solarbo and many others.

RADAR CO., LTD.
2 Observatory Road Kowloon, Hong Kong
K-680-507

OREGON—MILTON FREEWATER
Planes R/C, C/L and F/F. Boats, Trains in all scales and cars. Top lines in plastics. Modeling accessories, motors and finishing materials. Also artists and craft supplies, books and kits. "Just don't buy a gift, buy a hobby." "Hours 6 days week 10:00 AM to 5:30 PM. Closed Sundays.

THE HOBBY SHACK
P.O. Box 406, 604 N. Main St.,
Milton Freewater, Oregon 97862

NEW YORK—BUFFALO
Factory authorized Orbit and Micro-Avionics sales-service center. New Orbit and Micro radio systems at very best prices. Complete stock of parts and accessories. Immediate service on all Orbit and 1970 Micro systems. Guaranteed reconditioned previously owned Orbit systems always available.

ORBIT NORTHEAST
3833 Harlem Rd. 14215 Ph. (716) 836-6860

WEST VIRGINIA—PARKERSBURG
Planes-R/C and Control Line, Engines and accessories. All kinds of Goodies! Kraft, Orbit and Pro-Line Radios, Sig Products, Lionel Trains. Also HO and N gauge trains and accessories. HO slot track in store. HO slot cars and parts. Hobby supplies.

WILSON HOBBY SHOP
Park Shopping Center
Parkersburg, W. Va. 26101 304-428-0713

MEXICO—MEXICO CITY
The most complete stock of aeromodeling and Radio Control supplies in Mexican Republic.
Factory authorized Kraft System, Pro-Line System, Webra and H.P. Engines.
Sales and Service center, all best items and the best prices.
We accept Bancomatic and Bancomer Cards.

MATHELIN MODELISMO
Retorno DeGral, Ignacio Zaragoza No. 47
Mexico 9, D.F. Tel: 5-71-75-07

SOUTH CAROLINA—NEAR BOWMAN
Located on Road 36 just off Interstate 26. Most complete U-control center in entire state. Discount prices. Free use of excellent circles and R/C strips. Open 4-7:30 Tues-Fri. and all day Saturdays. Flying every Sunday afternoon. Plenty of help for beginners.

ACTION HOBBIES MODEL AIRPORT
Route 1, Box 63AB Bowman, S.C.
Tel: (804) 829-2368

COLORADO—COLORADO SPRINGS
Complete line of U-control, Free Flight and Engines. Headquarters for R/C. We feature Royal Classic. Lee Engines, Sig Products, Master Charge Discount to AMA Members. "We Fly What We Sell."

CUSTOM HOBBIES
2408 E. Platte Ave., Colorado Springs
Colorado 80909 (303) 634-7400

GEORGIA—DECATUR
HO Railroads, Planes, Model Car Racing Open 11 AM to 10 PM Metro Atlanta's Friendly hobby shop.

HOBBY HOUSE
DECATUR SPEEDWAY
130 E. Ponce De Leon 378-2253

MICHIGAN—DETROIT (FERNDALE)
Trains, planes, stamps, coins, R-ways. Over 50,000 items for hobbyists. Mich largest antique train collection. Look for our 55' RR crossing sign. Arnold Rapido.

MODELS HOBBY CENTER
22524 Woodward Ave. (Zip 48220) LI-3-2242

ALABAMA—BIRMINGHAM
Most complete line of plastics, U control, Orbit micro equip. & repairs, R/C Kits, OS engs., HO, N, O, & gauge trains supplies, Tyco, Aurora Race Sets & Access. Help for beginners. Hours: 9-5:30 weekdays & Sat, Thurs. 9-9.

HOMEWOOD CYCLE HOBBY SHOP
2834 S. 18th St.
Birmingham, Alabama 35209
(205) 879-3986

CALIFORNIA—LAKEWOOD
Westcoast R/C Headquarters, complete line, MRC, Futaba, Kraft, RS Systems, Orbit, etc. Also complete line of kits, R/C and C/L. SEE US.

HOBBY WAREHOUSE
4128 E. South St. Lakewood, Calif. 90713
(213) 531-1413

ALABAMA—BIRMINGHAM
Most complete line of plastics, U-control, Orbit Micro equipment repairs, R/C kits, OS engines, HO, N, O, & gauge trains supplies, Tyco, Aurora Race Sets & Accessories. Help for beginners. Hrs. 9-5:30 weekdays and Saturday, Thursday 9-9.

HOMEWOOD CYCLE HOBBY SHOP
2834 S. 18th Street
Birmingham, Alabama 35209
879-3986

CLASSIFIED ADS

Rates: 30 cents per word (including name and address). Minimum—10 words. Send remittance with copy and order to: AMERICAN AIRCRAFT MODELER, 733 Fifteenth St., N.W., Washington D.C. 20005

MODEL AVIATION BOOKS: Out-of-print. List 25 cents. JOHN ROBY, 3703D Nassau, San Diego, Calif. 92115.

BUILDING AN AEROPLANE: This 1912 reprint contains plans for constructing a Bleriot monoplane and a Curtis Biplane plus some real surprises. $3.95-PP. ED'S SALES, Dept.-D, 613 E. Grumman, Oklahoma City, Okla. 73110.

Available NOW! The 1974 Radio Control Products Directory. Information and pictures on over 1100 products. Only $2.75, plus free mid-year supplement. Send check or MO to: RC Products Directory, Dept. C, 733 15th Street, N.W., Washington, D.C. 20005.

OLD TIMER PLANS: ½A Free Flight, 36-in. wingspan, Zipper, Zomby, Buzzard Bombshell, Brooklyn Dodger, Red Zephyr, Flying Quaker, Request, Pacer, Gladiator, New Ruler, Clipper 1, Garami Skylark $2.00 each postpaid. H.L. Bochman Model Plans, 1035 Crestview Ave., Seal Beach, Calif. 90740.

HELIUM BLIMP: Fly it in your living room. Easy to build plans—$2.00. KNOX PRODUCTS, 1107 Montesano, Waukegan, Ill. 60085.

HANG GLIDING: The Basic Handbook of Skysurfing. Complete, detailed information designing building and flying foot launched gliders. 205 pages, 350 illustrations. $5.35 postpaid. Dan Poynter, 48 Walker, Suite 136, North Quincy, Mass. 92171.

R/C SCALE PLANS: XF5F Grumman Skyrocket, F6F Hellcat, TBF-1C Avenger, B-17G Flying Fort, Fr-1 Ryan Fireball, Lee Mahoney's Sorceress, Gee Bee R-1, Boeing F4B4. Send cents for detailed brochure and prices. AER-O-SCALE, P.O. Box 3413, Granada Hills, Calif. 91344.

Super Tigre and Max engine parts books, listing parts, prices for all models, 75 cents each postpaid. Don's Sales & Service, P.O. Box 224, Ft. Thomas, Ky. 41075.

Fast Personal Service! Low Prices! Write for free R/C kits, engines, supplies sheet. Northwest R/C Electronics, 19812 48th Ave., West, M1, Lynnwood, Washington 98036 (206) 778-5652.

Old Timer wants an M-5 Radial engine. Send price and description to William Parker, P.O. Box 766, Mableton, GA. 30059.

12, 6, or 1½ volts. Starter, pump, glowplug power from one battery $15.00. Charger-$5.00. The Plant, Box 404, Cliffside, N.C. 28024.

RADIOS AND ENGINES REPAIRED: Nationwide service. $35 maximum charge on radios. $12.50 on engines. Parts extra, at reduced prices. Includes all Heathkits, World Engines, Kraft, Royal, O.S., Super Tigre, Webra, Enya. 90 day Guarantee. Enclose check and phone number. Aero Tech Products, P.O. Box 182, Lake Hiawatha, N.J. 07034. Phone: (201) 887-7672. Questions? Write! We'll call you.

ELECTRIC FLIGHT—WORLD RENOWNED ALPHA POWER UNIT. Flies schoolyard minis to 8 foot gliders. Buzzer's YAK 12, Willard's ALPHA ROAMER (March RCM), many more. Plans available. Highest power, lightest weight, recharge 11 minutes. Complete control systems. Power unit, charger only $54.95. GALLER ELECTRONIC INDUSTRIES, P.O. BOX 87, So. Walpole, Massachusetts 02071, (617) 668-0467.

Choice vintage model magazines. Lists 30 cents stamps. AVMODMAGS, 107 Alameda, Redwood City, CA. 94062.

R/C Scale plans, Macchi M-39 (1926 Schneider Cup Trophy winner), 56" wingspan, original three-views for judging. $8.95. Check, M/O, Richard Calderigi, 54 Warwick Drive, Ludlow, Mass. 01056.

R/C AUTO RACE CARS—1/8 SCALE—1971 & 1972 NATIONAL OVAL & ROAD RACE CHAMPIONS. The most NATIONALS Trophies (7) 1973. Send for free catalog. ASSOCIATED ELECTRICS, 1928 East Edinger, Santa Ana, Calif. 92705.

Flite Systems, for any digital transmitter, 2-8 channels, guaranteed, free brochure, QUANTIZED CONTROL, 19 Moss Lane, Amherst, Mass. 01002.

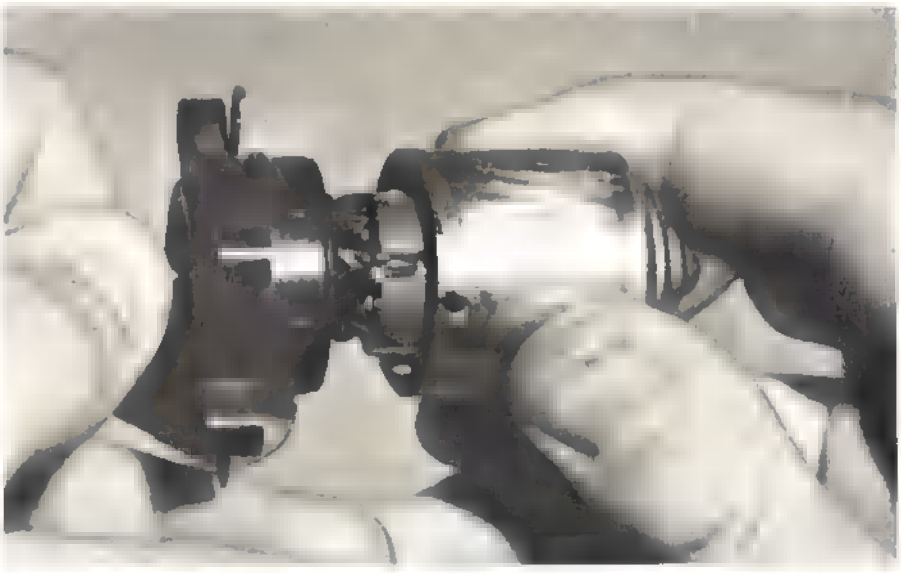
An "electri-flying" Dream

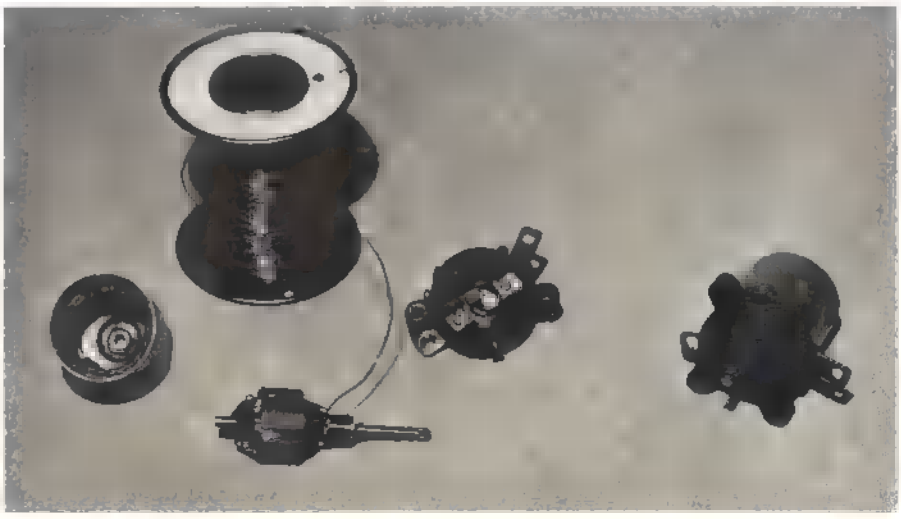
This month, build an electric motor for $5.00; next month power Dick's Dream with it. / by Mitch Poling & George Bewer

This month covers the construction of the motor unit; next month will cover the airframe construction. The motor unit turns a 5¼ x 3" prop at 12,000 rpm, and has more power than a Pee Wee 020, and a little less than a Tee Dee 020. It is suitable for most 020 rudder-only or free flight planes. The mini Old Timers would be ideal for it, either RC or free flight.

Go out to the local salvage yard, and look for a 1971-74 Plymouth or Dodge. Earlier models will do, but take more work to modify. Pull the windshield washer motor yourself; you need no tools to do so. Earlier models have the pump mounted separately, so tools are needed. The motor and pump are mounted on the underside of the plastic washer tank. Pull the pump unit off the tank. This ruins the tank, but you don't need it anyway. Twist or pull off the motor wires. Check that the motor has three retaining screws to hold the front cover of the motor onto the motor case. Earlier models do not have these screws —just punched dimples, which will have to be drilled out. It is simpler to get the one with screws. If you pull the motor yourself, the unit costs about $3, if the dealer does it, about $5. Scrub off the dirt, and remove the motor from the pump by sawing through the mounting rivets.

Remove the three retaining screws for the front cover (don't lose them!), and pull off the motor case. Do this ■ in the photo, which shows the correct way to hold the shaft. The brushes are inside the front cover, and can be damaged if the front cover is removed abruptly. The front cover is sealed internally with rubber cement, so it may take some prying with ■ small screwdriver to get things started. Once the case is off, remove the composition washers on the back shaft and save them. Carefully pull the armature from the front cover; you may need to use a





ABOVE: The front shaft must be held, as shown, when assembling and disassembling the motor unit. This prevents brush damage. BELOW: The internal parts of the front cover and case of the Plymouth or Dodge motor. The unit at the right is of '74 vintage, having four mounting lugs.

small screwdriver to hold back the brushes so that they will not strike each other. Remove the copper washer from the front shaft and save it.

The armature windings are held onto the commutator by small tabs which are folded down quite tightly. These tabs should be pried up to a 45° angle so the windings can be removed, and left at the 45° angle to retain the new windings. It is not an easy task to bend up the tabs, and it must be done carefully or the tabs will break off. The easiest way is to cut a small slot under the front of each tab with a razor saw, then pry up the tabs to 45° with an X-acto knife. Count on using up a few blades in the process. See the photos for the technique. Unwind the armature, starting with the coil that stands free (no coils overlaying it). Note the direction of the winding, and sketch what you do, as you will want to duplicate the order and direction of the original windings.

Rewind the armature with No. 26 magnet wire (Radio Shack, Ace Radio, radio shops). You have a choice of 25 to 35 turns per two poles. Thirty-five turns give flights of five minutes or better, and will not burn out if stalled, even on a fully charged flight battery. However, packing in 35 turns is a challenging task. Twenty-five turns give about four-minute flights, more rpm, and faster climbouts. If it is stalled on a freshly charged flight battery, it can burn out (but you know how to rewind it again!). It is much easier to wind; thirty turns might be a reasonable compromise. All these will fly the Dick's Dream on a 5¼ x 3 Top Flite prop. As you wind, pack in each turn with a fingernail clipper handle, as shown in the photo. Once the turns are on the pair of poles, loop the wire under the commutator tab. Sand or scrape away the insulation in the loop, and tin the wire with rosin solder (use a pen iron—instant heat transformer guns can ruin the motor magnets). Check to see that the loop is tinned all the way around. If not, scrape away any islands and bits of insulation, and repeat the tinning.

Solder the loop under the tab. Do not let solder flow out onto the commutator surface—it will cause damage to the brushes. Start the next pair of poles. Note that one continuous wire is used.

Once the winding is done, epoxy (five-minute epoxy) down the windings in the slots between the poles. Check that the epoxy and windings clear the inside diameter of the motor magnets. Reassemble the copper washer, armature, and front cover with brushes. Check the brushes to be sure that they are sitting on the commutator surface and that there are not any tight clearances between them and the commutator tabs. If there are any close clearances, bend the brushes away from them. Put the composition washers on the back shaft, and reassemble the motor, holding the front shaft as shown in the photo. (This prevents the brushes from slipping off the commutator.) The plastic tab projecting from the back of the front cover must mate with the corresponding notch cut in the magnet. If the front cover does not fit flush, the tab is not in alignment. Rotate the cover until the tab clicks into place. Secure the case with the screws.

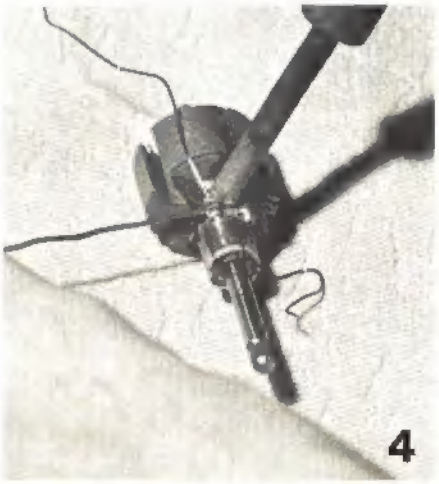
Drill a 13/64" hole in a Top Flite 5¼ x 3 prop. Do this by securing the drill in a chuck or vise, and twist the prop onto the drill by hand. Any other technique will mess up the prop hub. Fit a sleeve of medium neoprene fuel tubing in the hub, and press the prop on the motor shaft. Check rpm with a flight pack of six GE/GC-1 "AA" nickel-cadmium cells, or Gould cells (38K40, Ace Radio). Rpm should be 12,000. If it is less, check the battery pack (fully charged?). If one cell is hot, it is bad, and must be replaced. If all the cells are hot, the cells are not adequate for high drain (current draw is five to eight amperes). The cells listed above are recommended.

Wire the battery pack in series with 3/4" lengths of extension cord wire. Charge at an initial rate of three amperes for ten minutes. Good luck and good flying!

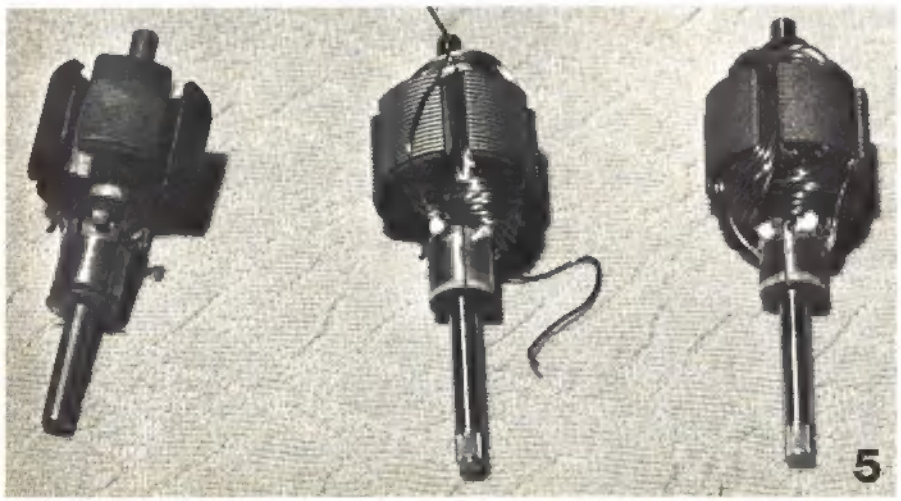
Photos by Bruce Fields

2

3



4



5

(1) Bend up the tabs on the commutator. This model is from a '67 car, and is slightly different in appearance. (2) Squeeze down those windings as you pack in the turns. (3) Scrape away wire insulation where it goes around the solder tabs. '71 model shown. (4) Use a soldering pencil to secure the wire to the commutator tabs. (5) As easy as one, two, three. Step one, on left, is the bare armature. In the center, all the windings are in place and soldered. Finally, epoxy the armature windings in the slots between the poles. Note that the commutator surfaces are kept clean of any solder.

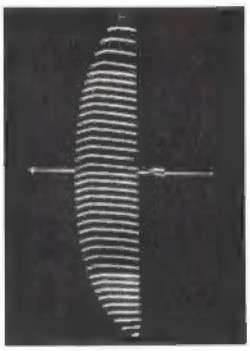
COMING IN

SEPTEMBER

YANKEE: An exceptional pattern design / by Bob Noll

MAX-FLY: Maximum performance sailplane. / by Gil Rifkin

AERO SPORT: RC trainer that is basic / by William Patterson



SUPERSWEEP: Record holding IHLG / by Ron Wittman & Bob Meuser (Part 1)

LEPERE: Double article on the model and its full-scale counterpart by Floyd Carter & Patti Groves

ALSO: Paint for Performance / Construct a Scale Cockpit / Bakersfield Report (Pylon) / The Tricathalon (Soaring) / **AND OUR STANDARD FEATURES:** Getting Started in RC / AAM Tests / New Products Checklist / Modeler's Bookshelf / Where The Action Is

COMPLETE AMA NEWS SECTION

OFF THE SCENE

TOMORROW

WE WILL BE HERE TO SERVICE THE SETS WE SELL TODAY.

WRITE FOR FREE CATALOG

KRAFT SYSTEMS, INC.

World's Largest Manufacturer of Proportional R/C Equipment

450 WEST CALIFORNIA AVENUE, P.O. BOX 1268, VISTA, CALIFORNIA 92083

Webra .60 size R/C engines won in the 1969 and 1971 International Pattern Events. They swept the Nationals in 1971 and 1972 making the name "Blackhead" synonymous with winning power. Refined for 1974 it provides still more power and retains its winning reliability. In addition, two new recently introduced Webra's now give the flier even more power without loss of flexibility or superb control. These new engines use Schneurle porting and are available in both front and rear intake versions. They are perhaps the most powerful engines in production today.

Webra 61 powerplants feature easy starting both hot and cold with unequalled top end power and dependable low end idle. Low vibration and steady operation are evident throughout the speed range.

Webra's three big .61's provide the extra reserve power needed for larger, heavily loaded scale models and for those graceful maneuvers with today's FAI pattern designs. Webra, today's dependable Power Line. See them at your hobby shop.

Model Rectifier Corporation • 2500 Woodbridge Avenue • Edison, New Jersey